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NOTE on PHENOL-PHTALEIN as an INDICATOR in TITRATIONS.

By Charles W. Drew, Ph.B.

The want of a delicate and reliable indicator for use in volumetric determinations of acid and alkali has long been felt by analytical chemists and practical pharmacists. To those indicators, such as litmus, turmeric and cochineal, which have been most extensively employed, there have been numerous and valid objections based upon the facts that they are colored in both acid and alkaline solutions, and that the transition from one color to the other was appreciably gradual, and hence introduced a source of error into analytical operations, which could be avoided, and then only partially, by continued practice with uniform solutions.

Within the past few years several substances, as fluoresceïn, rosolic acid, neutral salicylate of sodium and iron, anthocyan, etc., have been proposed as substitutes, but all have met with objections either from their rarity, and consequent high price; from the fact that the changes in color were not marked at *exactly* the point of saturation, or else on the ground that the reaction was not characteristic of acids and alkalies alone—other substances producing similar changes in color.

My attention was lately directed to a substance, *Phenol-Phtaleïn*, which was discovered a few years ago by Baeyer and whose general properties were briefly described by Dr. E. Luck ("Ber. d. Deutsch. Chem. Ges.," 4, 658). This substance seems to the author to, in a great degree, meet the wants of analysts who desire an extremely delicate and reliable indicator.

The *neutral* and *acid* solutions of this substance are *entirely colorless*, and by the faintest excess of *alkali*, *an intense carmine color is developed.* This color is discharged with equal readiness by the addition of sufficient *acid* to render the solution *neutral* in reaction.

The mere fact of the transition being from a colorless solution to one of a high color, gives it a great advantage over any of the test solutions in common use, and to this we may add, that for delicacy, tenuity and quickness of response to infinitesimal amounts of acid or alkali, it is immeasurably superior to them all.

The substance is best employed in solution in alcohol of 20 to 25 per cent., and of a 1 per cent. solution 4 or 5 drops are ample for 50 to 100 cc. of the solution to be titrated. However, the strength of the solution is immaterial, and the proper amount to be added can readily be found by one or two trials. In accurate work it will always be necessary to add a few drops of alkali, to render the solution exactly neutral as the Phenol-Phtaleïn, when dissolved, has an acid reaction.

In order to illustrate the delicacy, I will give, briefly, the results of some few experiments upon it: 0·05 gram of Phenol-Phtaleïn dissolved in 25 cc. of 95 per cent. alcohol, the acidity counteracted by the addition of 1·75 cc. of decinormal solution of sodium hydrate, when made up to 200 cc. with distilled water, contained of Phenol-Phtaleïn in each cubic centimetre 0·00025 gram.

0·5 cc. of this solution = ·000125 gram of Phenol-Phtaleïn was made up to 250 cc. with water, and ·5 cc. of decinormal solution of sodium hydrate, = ·002 $HNaO$, was added; a very distinct pink color was given to the solution, although it represented only 1 part of Phenol-Phtaleïn in 2,000,000 parts of solution.

An increase in the amount of test solution decreased the amount of alkali required to develop the same shade of color as well as the amount of acid necessary to discharge it. 5· cc. of the test solution = ·00125 gram of Phenol-Phtaleïn, when made up to 250 cc. with water was colored a brilliant carmine by 0·2 cc. of decinormal odium hydrate = ·0008 gram of $HNaO$, or 0·02 cc. of normal solution of Sodium Hydrate. This color was completely discharged by the addition of 0·2 cc. of decinormal oxalic acid = ·00126 gram of $C_2H_2O_4$, or 0·02 cc. of normal solution of oxalic acid. This proportion represented 1 part of the substance under examination in 200,000 parts of solution.

It is, of course, impracticable to work with such minute amounts, yet the experiments serve to demonstrate that the delicacy of the indicator is much beyond appreciation by ordinary apparatus and with solutions of the strengths commonly employed.

I have made a large number of titrations of various solutions, and have never found the indicator to work other than satisfactorily. The color is developed by all alkalis and discharged by all acids, including carbonic acid, hence it is, like litmus, unfitted for use in the titration of carbonates in the cold.

Upon thorough trial I regard this as very greatly superior to any other indicator in use for acids and alkalis, and consider that it deserves a prominent place among reagents for volumetric analysis.

Brooklyn, N. Y., October 4, 1878.

A NEW EXCIPIENT FOR PILLS.

By Richard V. Mattison.

Read at the Alumni Meeting, Philadelphia College of Pharmacy.

We have received from our friend Mr. Wm. J. Martin, of Cincinnati, Ohio, a gentleman of very large experience in the actual work of dispensing, and having at his command one of the most perfectly arranged prescription departments in the country, some notes on an excipient for pills, designed to be used as an almost universal excipient in the preparation of the varied assortment of the pills daily prescribed.

Its advantages are, first, ready solubility; second, small bulk; third, unusual plasticity and adhesiveness; fourth, body. By the latter we mean that it has an inherent quality of being able to hold itself up, and further, this quality prevents the falling or flattening common to pills containing heavy substances, as calomel, subnitrate of bismuth, acetate of lead, &c. This of itself is most desirable, and becomes extremely so in relation to the small bulk of the excipient required in the preparation of a suitable mass. Its only disadvantage, seemingly, is color, it producing with white powders a colored mass, which, with quinia and similar alkaloids, may preclude its use, since it is the fashion to have these prepared as light-colored as possible. The excipient recommended by Mr. Martin is made by taking one part of powdered gum tragacanth and seven parts of powdered elm bark, and using either water or syrup, preferably the latter, to make the excipient of the requisite plasticity. The boxes exhibited here contain pills made according to the formulæ below, and were prepared, with the exception of the quinia pills, in June last. The quinia pills were made early in the present year, being about ten months old. Pills usually difficult of preparation have been selected, and we are assured no difficulty is found

in preparing them with the above excipient. The pills that have become hard will be found of easy disintegration and ready solubility, and for these reasons is the excipient a desirable addition to the dispensing counter:

Number of Box.		Weight of Materials.	Weight of Excipient.	Number of Pills.
1	Quevenne's Iron .	60 grs.	8 grs.	30
2	Ferri Sulph. Exsic.	60	6	30
3	Bismuth. Subnitr.	120	6	24
4	Pyrophos. Iron .	72	8	26
5	Citr. Iron & Quin.	60	8	30
6	Asafœtida (U.S.P.)	96	4	24
7	Blaud's . . .	60	3	30
8	Camphor, 30 grs. / Acet. lead, 15	45	3	15
9	Camphor, 24 grs. / Capsicum, 24	48	6	24
10	Camphor, 30 grs. / Ex. Hyosc. 30	60	3	30
11	Calomel . . .	60	3	20
12	1, 2 and 5 gr. Quinia Pills.			

Philadelphia, Tenth month 4th, 1878.

CHAMBERSBURG HYDRANT WATER.

By Thomas Canby Craig, Ph.G.

Abstract from an Inaugural Essay.

The town of Chambersburg, Pa., is supplied with water drawn from the Conococheaque creek, the origin of which is in the South Mountain, about fifteen miles to the eastward.

After skirting the base of the mountain for some distance, this stream changes its course and flows through a fertile and well-cultivated section of country, through iron, lime and sandstone land.

As no manufactories are situated along its banks that would in any way unfit it for domestic use, it was considered to be as pure water as was accessible.

The water is pumped directly from the creek—no dam or forebay being used—into a reservoir, and is thence conveyed to different parts of the town through cast-iron pipes.

The specimen examined was collected on the 21st day of August—a time of year in which farmers are hauling manure upon the fields, which, with the old hay and straw left from harvesting and dead weeds and falling leaves, forms decomposing heaps, parts of which are naturally washed into the creek by heavy rains, prevalent at this season.

A preliminary *qualitative* examination was first made, and afterwards one liter of the water was carefully evaporated and the residue dried at 110°C.; it weighed ·090 gram. The free carbonic acid and ammonia were determined separately. The results were as follows:

Iron,	·0126 grams,	14·00 per cent.
Alumina,	·0029	3·22
Silica,	·0055	6·11
Calcium,	·0209	23·22
Magnesium,	·00908	10·08
Potassium,	·0067	7·44
Sodium,	·0016	1·78
Sulphuric acid (SO_4),	·0077	8·55
Phosphoric acid (PO_4),	·00509	5·65
Carbonic acid (CO_2),	·015	16·66
Chlorine,	·00215	2·38
Organic matter,	·00125	1·38
Total,	·09047	100·52
Total residue,	·09	100·00
Gain due to error,	·00047	0·52

Free carbonic acid, gram ·02
Free ammonia, " ·0004

Temperature of the water, 22°C. Hardness, 3.45°.

This water must be regarded as very pure and highly fit for domestic use. It contains a small proportion of free ammonia, about 4-10 milligram in a million, and but one and thirty-eight hundredths per cent. of organic matter in the solid residue, which is not sufficient to produce enough free ammonia, even in the summer months, to render it unfit for drinking purposes.

Phosphoric acid does not usually exist in such a large proportion, seldom more than a mere trace being found in river waters. But we may account for these phosphates in this instance from the fact that the stream flows through a highly cultivated section of country—the Cumberland valley—and receives much of the fertilizing substances which the farmers put on their fields. These fertilizers consist largely of phosphates.

The absence of copper, lead and other poisonous metals would further indicate its total freedom from injurious properties.

EXTRACTUM CANNABIS INDICÆ.

By William H. Deprez, Ph.G.

Abstract from an Inaugural Essay.

The author endeavored to ascertain the quality of commercial extract of Indian hemp from its behavior to solvents. The amount of moisture was first determined by exposing 100 grains of the extract to the heat of a water bath until it ceased to lose weight. The residue was next treated with water until deprived of all principles soluble in this menstruum, and the undissolved portion dried and weighed. A portion of the undissolved residue was then successively treated with petroleum benzin, benzol and alcohol, and in each case the amount of the dissolved matter ascertained. A small residue was finally left, which was found to be insoluble in ether, chloroform, olive oil, oil of turpentine and potassa. The samples examined were: 1, one prepared from gunjah by the process of the U. S. Pharmacopœia; 2, a sample prepared in Germany; 3 and 4, two samples prepared by two different manufacturers in England. Calculated for 100 grains of the original extracts, the results were as follows:

		Soluble in					
	Loss by Heat.	Water.	Petroleum Benzin.	Benzol.	Alcohol.	Insoluble.	Total.
1	1·7	1·5	73·8	18·4	1·4	3·3	100·1
2	1·2	1·7	73·8	17·5	2·3	3·5	100·0
3	10·5	3·4	65·4	16·5	1·4	2·7	99·9
4	2·0	18·8	60·2	15·4	0 9	2·7	100 0

GLEANINGS FROM THE GERMAN JOURNALS.

By Louis von Cotzhausen, Ph.G.

Codliver Oil.—Th. Husemann compared the medicinal virtues of different kinds of codliver oil with the object of determining the active constituents. He denies the presence of any particular active principle, curing scrophula and lung diseases, and believes that its efficacy is entirely due to the mixture of the glycerides of fatty acids, it differing, however, from other oils in being absorbed and in oxidizing more quickly in the human body. He states on the authority of Professor Almén, who has devoted many years to the analysis and study of the different kinds of codliver oil of commerce, that a nearly white oil may be made by heating fresh codlivers, previously cleaned

and washed, in well-tinned kettles by steam, decanting the exuding oil, straining it and exposing it to a low temperature; on conveying it afterwards to a warm room, all stearin will crystallize and settle. The oil should then be decanted, bottled and sealed, and may be kept for six years without becoming rancid.—*Zeitschr. Oest. Apoth. Ver.*, Aug. 20, p. 386, from *Pharm. Handelsbl.*

Effect of Food on the Formation of Bone.—Lehmann states that a young pig, fed for 126 days on potatoes alone, was attacked by Rachitis, while the skeleton of others of the same age, supplied with potatoes and phosphates as food for the same length of time, was fully developed, there being, however, a considerable difference between them; those fed on potassium phosphate had more porous and specifically lighter bones, than those supplied besides with phosphate and carbonate of calcium.—*Chem. Centralbl.*, No. 31.

Alleged Anhydrous Quinidia (Conchinia) Sulphate.—O. Hesse contradicts Petit and De Vrij's statements that commercial quinidia sulphate is nearly anhydrous, and states that the homocinchonidia salt is the only anhydrous sulphate of the cinchona-alkaloids, while quinidia sulphate contains in 100 parts: 82·87 alkaloid, 12·53 H_2SO_4, and 4·60 water of crystallization; it loses not more than 1 per cent. water at 100°C., but parts with all when kept for some time at a temperature of 120°C., and soon regains it again on being exposed to a moist atmosphere.—*Ber. Deutsch. Chem. Ges.*, 1878, p. 1162.

Milk as a Vehicle for Quinia.—Battersburg considers milk the best vehicle for quinia, and states that 0·06 gram of quinia in 30·0 milk can scarcely be detected by the taste, while 0·12 quinia imparts only a slightly bitter taste to 30 grams of milk, and 0·03 quinia in a tumblerful of milk cannot be tasted at all.—*Pharm. Ztschr. f. Russl.*, August 15, from *Aerztl. Intell. Bl.*

Cinco Folhas and Sparattospermin.—Sparattosperma leucantha, *Mart.*, syn. Bignonia leucantha Vellos., belonging to the natural order of Bignoniaceæ, indigenous to Brazil, commonly known as *Cinco Folhas* (five-leaf), is described by Dr. Theo. Peckolt as a stately, high tree, losing its foliage in July, and obtaining it again in November, its delicate, white blossoms soon turning to a light-violet color; the fruit ripens in February, and consists of pods as thick as a finger and about

30—40 centimeters in length. The leaves are the medicinal portion of the plant, and are used as tea for liver complaint and kidney diseases with excellent success. Their efficacy seems to be due to *Sparattospermin*, which is obtained by extracting the leaves or twigs with water, boiling, refiltering, evaporating to the consistence of an extract, treating this repeatedly with boiling alcohol (spec. grav. 0·833), evaporating the alcoholic solution to dryness, treating this residue with cold water, and purifying the crystalline powder by recrystallizing from boiling alcohol. Sparattospermin possesses no odor, but a bitter alkaline taste, and has the composition $C_{19}H_{24}O_{10}$. It is not a glucoside, and is colored yellow by sulphuric acid.—*Ztschr. Oest. Apoth. Ver.*, Aug. 10, 1878, p. 361.

Copper in Ammonia.—On passing sulphuretted hydrogen into commercial ammonia water, A. Schwalm obtained a blackish-brown precipitate, which on further examination was found to be sulphide of copper. The presence of copper was not indicated by any change of color in the ammonia water.—*Phar. Zeitschr., f. Russland*, Aug. 15, p. 483.

Ammoniated Citrates.—Ed. Landrin reports as the result of a series of experiments, made to determine whether the ammonium salt only serves as a solvent, or combines with metallic oxides, forming double salts, that the citrates of calcium, barium and strontium, being insoluble in water, are soluble in any aqueous solution of ammonium citrate, while magnesium, aluminium, iron, manganese, nickel, cobalt and copper form definite double salts with citric acid and ammonium. —*Chem. Centralbl.*, No. 32.

Oxalic Acid as an Absorbent of Ozone.—Jeremin finds that a considerable quantity of ozone is absorbed by an aqueous solution of oxalic acid, and will keep in this solution for any length of time, becoming more efficient with age as a disinfectant. Gaseous ozone keeps better in contact with air than in the dark. The author prepares a cement from pumice-stone, paraffin, wax and rosin, which he claims to be proof against ozone.—*Ibid.*, No. 33.

Vagina globules, frequently prescribed in Germany, consist of a jelly prepared from 1 part of gelatin and 6 parts of glycerin, medicated with potassium iodide, sulphate of zinc, sulphate of copper, etc., and

congealed in suitable moulds. Since tannin cannot be combined with this mass, E. Rennard recommends the use of *Agar-Agar*, a vegetable gelatin made in Japan, principally from *Fucus Amansii*. This contains no nitrogen, and can also be used for culinary purposes. Rennard uses 1 part of Agar-Agar, 10 parts of glycerin and 20 parts of water; the jelly is entirely transparent, while if made of Agar-Agar and water alone (1·30), it is opaque.—*Pharm. Ztschr. f. Russl.*, July 15, p. 417.

Hehner's Method of Butter Analysis.—185 analyses, according to Hehner's method (see "Am. Jour. Pharm.," May, 1878, p. 257), of pure, adulterated and entirely artificial butter, and of different animal fats, have fully convinced Fleischmann and Vieth that pure butter yields a percentage of fatty acids varying between 85·79 and 89·73 per cent. They consider butter yielding 87·5 per cent. or less strictly pure; if the percentage is over 87·5, but does not exceed 89·73, there is a possibility, but not a certainty, of an adulteration.—*Ztsch. f. Analyt. Chem.*, 1878, p. 287.

Starch in Cacao.—Wittstein proved that the starch naturally existing in cacao is so enclosed by the fat and other constituents, that on adding iodine to a clear and filtered decoction of cacao, a blue color will not be obtained. This furnishes an easy method of distinguishing between the natural starch and starchy adulterations, the filtered decoction of which strikes a blue color with iodine —*Ztschr. d. Allg. Oest. Apoth. Ver.*, Sept. 1, 1878, p. 399.

Explosive gelatin, so-called because it resembles gelatin in appearance, was invented by A. Nobel as a substitute for dynamite, and combines the advantages of being 50 per cent. stronger and of not being decomposed by water. It consists of 94 to 95 per cent. of nitroglycerin and 5 to 6 per cent. of collodium, and is particularly adapted for filling torpedoes, etc.—*Pharm. Centralh.*, July 18, p. 271, from *Chem. Ztg.*

Gold and Silver Plating.—(1.) Dissolve 10 grams of gold in 40 grams HCl and 15 grams HNO_3, concentrate and evaporate off the acids as much as possible, precipitate the gold with ammonia, place on a filter and wash. Dissolve 100 grams of potassium cyanide in very little water, and dissolve the gold on the filter in this solution, always returning the filtrate to the filter until all brown particles are dissolved, then add sufficient distilled water to make 1 liter.

(2.) Precipitate 20 grams of silver, dissolved in 60 grams HNO_3 by an aqueous solution of 20 grams of caustic, potassa place on a filter, wash with water, and dissolve on the filter in an aqueous solution of 100 grams of potassium cyanide; add water to make 2 liters.

Both solutions are used by immersing the bright metals which are to be plated into them.—*Ibid.*, July 25, p. 282, from *Ibid.*

THE MICROSCOPE IN MATERIA MEDICA.

By Thomas Greenish, F.C.S.

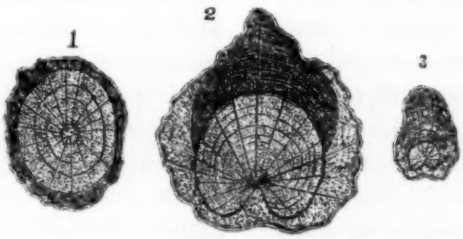
Vegetable histology is a subject which merits more attention from the pharmacist than it usually receives. The necessity of a general knowledge of botany or the natural history of the vegetable kingdom is fully recognized, but the pharmacist in dealing with the vegetable materia medica requires something beyond and more special than this general knowledge. He should know the organographic locality of the active constituents of the different plants used in medicine and also something of the histological localization or the particular tissue or tissues in which those active principles reside. The anatomy of these elementary parts of which the organs of plants are composed constitutes vegetable histology, and the several cells are distinctly visible and capable of being examined and identified only with the acid of the microscope.

As one instance in point, cinchona bark may be mentioned. Wigand investigated this bark with a view of determining the question which had occasioned some controversy, which of the cell tissues was the seat of the alkaloid? Chiefly through the employment of reagents he came to the conclusion that the alkaloid resided mainly in the bast or liber cells; but the more careful experiments conducted by Carl Müller have settled this question and have placed beyond doubt the fact that the parenchymatous tissue is the seat of the alkaloid in the cinchona bark, and this opinion has, I believe, never since been called into question. The relative proportions, therefore, of bast or liber to parenchymatous tissue in a given sample of cinchona bark, which to a certain extent may be indicated by its short or otherwise fibrous fracture, is an element of some practical value prior to a chemical analysis.

Cultivation, with reference to particular soils, has the property of

determining the development of one tissue at the expense of another; for instance, holly cultivated in a rich soil loses the spiny character of its leaves due to prosenchymatous tissue in the excessive development of its parenchymatous tissue. Some medicinal plants by garden cultivation lose much of their medicinal activity. Schroff states that this is the case with the aconites, and Hanbury mentions that the variation in quantity of volatile oil yielded by valerian is influenced by locality, a dry and stony soil yielding a root richer in oil than one that is moist and fertile, and I have but little doubt that this influence of soil is accompanied by a corresponding alteration in the histological elements of the valerian root.

Facts such as these are very suggestive to the pharmacist, and they may, on a little reflection, be much extended; but they are sufficient to show the value of a study of vegetable histology, without which the influence of soil, climate and cultivation on the development of particular elementary tissues cannot be accurately determined.



A parcel, supplied as senega root in the usual course of business to a pharmacist, was forwarded to me for microscopical examination. Its being a senega root at all was called in question. It will be observed from the sample that the roots are thinner, of a lighter color, and have fewer rootlets than the senega usually met with in commerce. Also the dark concentric rings are not present, and there is an absence of keel, with other characters of lesser importance. A decoction of it, as compared with one from an ordinary sample, is much lighter in color and in taste much less pungent. The histological examination proved it to be a true root of *Polygala senega;* a transverse section of it is represented by No 1 drawing. No. 2 is a section of a root of a senega of commerce taken across a keel, and showing the general structure to be similar to the preceding. No. 3 is a section of one of the rootlets.

I shall now proceed to describe the tissues histologically. For this

purpose No. 2, a section of the senega of commerce may be taken. The cortical portion or bark of the root is divided into three parts, an outer layer or periderm, composed of a series of two or three tabular cells of a yellowish-brown color; next, a middle layer of thin walled parenchymatous tissue, the outer cells stretched for the most part in a tangential direction. This layer is very unequally developed when there is a keel to the root, as is the case in this section; on that side it is smallest, from there it increases gradually till it reaches the opposite side, where it displaces more or less completely the inner layer, which is the most fully developed on the keel side, where also may be seen the bast or liber cells, and passing through this tissue the medullary rays.

Although the histological elements of these three sections are identical, yet in their relative proportions the three roots differ materially, and to the result of these differences, bearing immediately on the greater or less activity of the root, attention will next be directed.

Senega has probably not received so much attention as other substances of the vegetable Materia Medica, but Schneider, in 1875,[1] undertook the determination of the following points: the active principle of the senega root, and what part of the root contained it in the greatest quantity; but with the latter part only we shall have to do on the present occasion. Trommsdorff had, in 1832, stated that the active principle resided in the bark of the root only, and not at all in the woody tissue of the centre, and Schneider confirmed the correctness of his conclusions by analyses of different roots and different parts of the same root. The conclusions he arrived at may be summed up as follows, giving to the active principle of the root the name of senegin.

Rootlets,	9·26 per cent. senegin.
Middle-sized roots,	3·28
Thick roots,	3·02
Crown of the root,	2·6

The central woody portion being inert, I shall pass over that part and not further allude to it, excepting in reference to the space it occupies relative to the parenchymatous tissue, the seat of the active principle. From the conclusions of Trommsdorff and Schneider that the bark only yields the active principle, it will be seen that these sections have an immediate practical bearing on the value of senega root. No. 1,

[1] "Archiv der Pharmacie."

the root in question, has little bark relative to its woody and inert centre. No. 2, a section from a fair sample of the senega of commerce with a keel, has much more bark in proportion to its woody portion, and No. 3, a section of a rootlet, is nearly all bark. Calculating now the superficial area of parenchymatous tissue of the bark which contains the senegin, and comparing it with the prosenchymatous or woody tissue, which is inert, the relative proportions in the three roots will, approximately, of course, stand thus:

Rootlet, 8·5 to 1, (or relatively) . . .	17
Middle-sized senega, 3 to 1, ...	6
The senega in question, 1 to 2, ...	2

It will be observed how closely the superficial area of parenchymatous tissue, in which alone the active principle resides, corresponds with the relative proportions of senegin in the roots and rootlets analyzed by Schneider.

These enlarged drawings are to scale and the relative proportions exactly those of the microscopic sections from which they were drawn. It will now be seen why the rootlets yield so much more active principle than either of these roots, and it will at the same time be evident why the sample in question yields a decoction so deficient in strength. Schneider remarks that it would be impossible to obtain rootlets in sufficient quantity to meet the demand for senega, and recommends the use of roots of medium thickness, in accordance with the results of his analyses, and probably if these are well furnished with rootlets, so much the better.

The keel, generally considered an important feature of good senega root, is due to a peculiar development of bast or liber tissue on one side, and the same root may be quite round in one part, and have a development of keel in another; this keel is shown in section No. 2. Having isolated the elementary organs of a section across this particular part of the root, separated the tabular cells of the epidermis, the cells of the parenchymatous tissue, and also the liber cells represented by these waves in cellular tissue, and examined the individual cells so separated, I have always found that those of the parenchymatous tissue contained granular and oily matter, whilst the liber cells were free from it; and reasoning from analogous instances I am led to conclude that the liber tissue does not equally with the parenchymatous contain the active principle, and this may probably be the reason why middle-

sized roots, with less liber tissue, yield more senegin than those of larger size.

There is no doubt in my mind but that this root which has been called in question is that of *Polygala senega*, but it is deficient in cortical portion, the seat of the active principle, and is, I believe, a young and immature root, and consequently one that does not fairly represent the senega of our materia medica from which the preparations of the British Pharmacopœia are directed to be made. I think from what I have stated, and demonstrated by drawings from microscopical sections of different roots of senega, it will be seen how important it is that the senega employed in pharmacy should have its cortical portion fully developed, and the same process of anatomical analysis is applicable to almost every drug with which the pharmacist has to deal.

May I indulge a hope that the time is not far distant when vegetable histology, embracing the isolation and microscopical examination of the tissues so isolated, together with the microchemical analysis of the vegetable cell, will take its place by the side of botany in the practical course of study for the pharmacist; when an intimate knowledge of the seat of the active principles of the plants with which he has to deal, and the relative proportions of the special tissues containing those active principles, will exercise its due influence in the pharmacy, be felt in the drug markets, and react on the sources of supply, so that more judgment as to the time of collecting, and more care as to the mode of harvesting, may furnish us with the several drugs of the materia medica in the best possible condition for pharmaceutical preparations.—*Phar. Jour. and Trans.*, September 7, 1878.

MISCIBLE COPABIA.

By. T. C. Groves.

Some years ago my brother, Henry Groves (now of Florence), discovered the interesting fact that when a mixture of balsam of copaiba and oil of tartar (a saturated solution of carbonate of potassium) are shaken together and thereby emulsified, the creamy fluid after standing a few days deposits a white crystalline substance, leaving supernatant a clear stratum of apparently unaltered copaiba. It was, however, more or less completely saponified and rendered miscible with water, forming

with it a white emulsion. It therefore differs essentially from that which is known as soluble copaiba.

Since that time the preparation has occasionally been employed here, but as its applications were limited it did not, until the recent papers on copaiba by Mr. Siebold and others appeared, occur to me to examine the reaction.

As it is I have but made a superficial examination of the question, which, in order to do it justice, would require the expenditure upon it of far more time than I have at my disposal.

A sample some six or eight years old of this miscible copaiba (Bals. Copabiæ, Oi,; Ol. Tartari, ℥ii fl.) presented the following characters:

It was, as I have already said, similar in appearance and consistence to ordinary copaiba, but instead of having an acid it had an alkaline reaction, and when shaken with water instead of floating on its surface as ordinarily it readily formed with it a white emulsion, more or less stable according to the degree of dilution. This emulsion was of course readily destroyed by acids. As regards its behavior towards solvents it differed little from ordinary balsam of copaiba. The only point worth remarking on in this connection was the fact that alcohol did not affect a perfectly clear solution, and caused after a few days a minute whitish deposit to collect at the bottom of the bottle. The removal of this substance (probably a resin-salt of potassium) did not, however, affect the emulsibility of the balsam.

So much for the fluid balsam which had been carefully drained off from the underlying white saline deposit. This was found to be imbedded in a pasty resinous substance on the surface of which were planted numerous crystals, slender needles of from one quarter to half an inch long. The mass having been well washed with benzol these crystals disappeared, and up to now they have refused on the evaporation of the solvent to put in a second appearance. The white substance left after the washing above referred to proved to be entirely composed of minute crystals of bicarbonate of potassium.

The action, therefore, of the acid resins of the copaiba had been this, to deprive two molecules of the carbonate of half their potassium, leaving the second atom to combine with both atoms of carbonic acid and one atom of water to form the acid carbonate of potassium and water known as bicarbonate of potassium. No evolution of gas, therefore, attends the operation. It seems, moreover, that balsam of copaiba

in the cold exerts no action on bicarbonate of potassium. The balsam of copaiba used in making the preparation above referred to was presumably the Maranham variety; it was obvious, however, that as the copaiba balsams of commerce differ as widely in their characters as in their botanical sources it would be desirable to experiment on well defined samples of known origin. I accordingly obtained from Messrs. Barron & Co., of Giltspur street, London, authentic samples of Maranham and Para balsams of copaiba and of Gurgun balsam, and treated them as follows:

In bottle No. 1 were placed 2½ fluidounces of Maranham balsam of copaiba and ½ fluidounce of oil of tartar. A fluid drachm of this yielded on evaporation 34 grains of solid saline residue.

Bottle No. 2 contained Para balsam of copaiba and oil of tartar in the same proportions.

Bottle No. 3 contained Gurgun balsam and oil of tartar in the same proportions.

Bottles No. 4 and 5 contained Maranham balsam of copaiba, adulterated to the extent of 10 per cent., in one case with linseed oil, in the other with Gurgun balsam. It was thought probable that these admixtures would be at once detected when the oil of tartar should be added; but as such was not the case and an opinion on the subject could not be certainly formed before the lapse of several days, I will not further refer to them.

Each of the mixtures well shaken over night showed signs the next morning of depositing. It was not, however, until five days had elapsed that the operation seemed complete.

No. 1 had by that time deposited a whitish layer of bicarbonate; over that lay a thin stratum of viscid resin, on the surface of which floated numerous small needle-shaped crystals; above that came the clear balsam, through which could be seen numerous crystals attached to the sides of the bottle. Neither layer was emulsible, although the lower one showed some tendency that way.

No. 2 differed altogether from the preceding. There was indeed the stratum of bicarbonate, but it was less in volume; the viscid resin was absent; the space occupied in the other case by clear balsam was here cleanly divided into two equal parts, the upper portion containing a pale colored essential oil not miscible with water, the lower portion a sapon-

ified balsam of the usual character, except that it had a little more color.

No. 3 took a considerable time to settle down into three tolerably distinct layers, the lowest portion dark and dense, occupying about one-fourth of the space, the middle of darker color still but less abundant, the upper fluid but both paler and thinner than the original Gurgun balsam. It was not emulsible.

A sixth mixture was now prepared with 2½ fluidounces of Maranham balsam of copaiba and ½ fluidounce of oil of tartar. This comported itself very differently from No. 1. It took much longer time to settle, and during the operation deposited neither crystals nor viscid resin. In fact the whole of the fluid portion was saponified and rendered readily emulsible.

It seems then that in order to prepare a perfectly miscible copaiba, the oil of tartar must be added in proportion to the acid resins present in the balsam, and that experiment only can reveal what that proportion should be.

The peculiar behavior of the Para balsam in contact with the oil of tartar points to the existence of radical difference between it and the Maranham variety. Whether it be anything more than this, that it contains a larger quantity of the essential oil than the saponified resin is capable of dissolving, further experiment must decide. I think it must be something more, as I find the essential oil of the Para balsam is not miscible with the completely saponified Maranham balsam, or with the saponifiable portion of the Para balsam, and it is in my opinion quite a moot point whether the essential oil of copaiba is in any proportion soluble in the saponified balsam. In fact I am inclined to regard the Maranham variety as a balsam, the Para variety as a balsam *plus* essential oil.

There are, I am aware, other varieties of balsam of copaiba known to commerce to which it might be interesting to apply this test, but it would be necessary to be quite sure about the identity and purity of the samples. Balsams of varied origin and also resinified essential oils might also be subjected to experiment.

For administration in capsules this miscible copaiba would seem to offer some advantages over the ordinary balsam. It would mix more evenly with the contents of the stomach, and not float on the surface, causing pain and nausea. Moreover, the alkali present would be bene-

ficial in the class of cases for which balsam of copaiba is usually administered. I have filled a few capsules of gelatin in order to see whether that material would be acted on injuriously by the saponified balsam. I will only add (*miseris succurrere disco*) that they are at the disposal of the members of the Conference, and that any report on their action that I may be favored with shall be treated confidentially.—*Phar. Jour. and Trans.*, [London] Sept. 7.

On the RELATIONS between the ACTIVE PRINCIPLES and the BOTANICAL CHARACTERS of OFFICINAL PLANTS.

By Professor A. Herlandt, Bruxelles.

Translated from "Archiv d. Pharmacie," July ("Jour. de Méd. de Bruxelles," 1878, March), by P. H. Dilg, Ph.G.

Are the relations existing between the properties and the physical characters of plants, as observed since the earliest botanical studies, merely coincidental, or are they governed by the laws of natural affinity, which endeavors to systematically associate all living beings?

The only important work on this subject is A. P. DeCandolle's, "On the Medicinal Properties of Plants Compared with their External Characters and their Natural Classification." This, like all his productions, is a masterpiece, which would obviate the necessity of again studying the question, if several circumstances did not compel it.

In the first place, his work dates from a time (1816) when chemistry had not isolated with certainty a single active principle. Very little was known of the analogy existing between families, and the latter themselves, being very deficiently limited, embraced many foreign elements. Notwithstanding that the majority of scientific men accepted the law suggested by Linnæus and extended by DeCandolle, there were some who would either not recognize it at all or admit it very reluctantly. Chief among them I mention J. Chatin, he contradicting the theories of DeCandolle most openly. In his work "On the Seat of Active Principles in Plants," he says: "Apocynaceæ.—Their properties differ greatly according to the species, consequently the celebrated theory of the similarity of the medicinal and botanical characters, which DeCandolle so emphatically supports, has no solid foundation."[1]

[1] Chatin makes use of the same law which he rejects, for in the same work he classes the plants in families, and then states their medicinal properties. He admits

It is not my intention to review the work of DeCandolle, but only to investigate some parts of the above interesting question, especially in regard to the limit of comparison which should be observed between the plants and the relative properties of their natural orders.

All authors accept as limit of comparison between plants the action which they exert on the animal organism. DeCandolle found this view of the question deficient, but the state of chemistry at his time warranted no other conclusion.

To establish an analogy, a well-defined boundary must be fixed upon, which in this study cannot be done by examining simply the properties of plants, but rather the nature and properties of their principal constituents.

All really medicinally active plants contain substances which, in most cases, have been isolated and chemically studied. These substances do not always embrace the entire properties of the vegetable from which they are obtained. On the contrary, it frequently occurs that the greatest diversity exists in their respective actions. The cause of this seeming anomaly is generally due to the fact that the activity of a plant represents the action of several bodies possessing different properties; therefore the action exerted on the animal organism by the vegetable is the result of different, sometimes even opposite, influences. This also makes the strongest point against the too eager endeavor of modern therapeutics to replace all plants by their active principles; it is also the principal cause of the difficulty met in the systematic classification of the simple medicinal plants according to their properties.

The importance of the chemical study of plants increases daily; it is the base of rational Materia Medica. Analysis is the only safeguard against the flooding of pharmacy by innumerable plants, which, to maintain in or introduce into it, would interest only charlatanism or ignorance. An officinal plant, whose constituents are not known, is nothing better than an empyrical remedy.

A very important fact which must be borne in mind is that the properties of the indisputably active constituents are not solely dependent upon the proportion of the elements united in their composition, but also on their molecular constitution. Bodies may be isomeric, have

that the *malvaceæ* are mucilaginous; that the *cruciferæ* show "a remarkable similarity in their therapeutical properties;" that the *loganiaceæ* contain a poisonous principle—in short, a large number of facts supporting the theory of Linnæus.

the same elements in the same proportions, and yet differ in their properties.

Such perplexing instances are morphia and piperina, thebaia and buxina. Then again, only the slightest difference in the chemical composition alters the properties of the bodies very materially. For example, quinia and emetia, both existing in the nat. ord. Rubiaceæ, differ only provided the formula for the latter is correct, in the latter containing three molecules more water than the first. A still more striking example is offered by morphia and its derivative apomorphia, the former containing only one more molecule of water than the other.

Evidently, there exists a tie between the narcotic papaveraceæ of the genus papaver and the emetic and irritant papaveraceæ of the genus chelidonium and sanguinaria. As known, curare prepared from Strychnos toxifera, possesses entirely different properties than the alkaloids of the other species of strychnos; but, by the experiments of Crum-Brown, Fraser, Jolyet, A. Cahours and Schroff, it has been demonstrated that the ethylated and methylated derivatives of strychnia act in the same manner as curare. Here, then, chemistry enlightens us on a point which, at first glance, appears to contradict the theory of Linnæus, and which, if the physiological properties were taken as standard of comparison, would be incomprehensible.

We know very little in regard to the laws which regulate the formation of the proximate constituents in the vegetable organism. We know that plants, like all living beings, are chemical apparatuses in active operation; but we know only the products, not the processes to which they owe their origin.

We may infer that oils and fats are more permanent reserve-nutriments than sugar and starch; but when vegetation is again awakened they are changed to soluble nourishments. We may suppose that the etherial oils of flowers are antiseptics, intended to shield their organs from the attacks of lower parasites. We know that the resin with which the buds are coated protects them from moisture; but what more do we know? "Of the entire long list of substances like Coloring-matters, Acids, Alkaloids, Wax, Tannins, Pectin, etc., the relation to other processes of transformation is unknown, as well as the physiological process in the plant life." (J. Sachs' "Handbook of Botany.")

One of the principal consequences of the various reactions occurring

during the life of a plant is the change of the nature and properties of the active principle according to the time at which the plant is analyzed, and according to the organ which is examined. This indicates the necessity of having a specified time—a balsamic period, as the ancient writers have it—for collecting every plant and every part thereof.

We will not here consider the influence of the soil on the chemical composition of officinal plants. This influence certainly exists, but its significance has undoubtedly been overestimated; generally it only regulates the quantity of water absorbed by the plants. If the plant is of an aromatic nature, moist soil and rain will cause it to be less active. In my opinion, the influence of hybridizing and variation is of much more moment. It is very probable that a natural or artificially-produced variety will exhibit a more or less marked difference from the parent type of which it arose. This is only a consequence of the principles of transmutation exemplified by our fruit trees and leguminous plants.

From these observations it follows that to form a limit of comparison between plants, their active constituents must be taken as foundation, and not their properties. This necessitates the entire discarding of all officinal plants whose composition is not satisfactorily established, especially the exotics, whose properties are even sometimes known merely from descriptions. When chemistry shall have made more advancement, when vegetable physiology shall have explained the office of every active substance, then the principles of Linnæus will become more universal and its exceptions reduced to their actual value. The more or less diluted state of the active substances, and the presence or absence of certain anatomical elements, have already shown analogies where they did not appear to exist. If, therefore, the exceptions which were incomprehensible to DeCandolle are viewed from this standpoint they are easily explained. Potatoes, like other solanaceæ, contain solania; cherry-laurel is both chemically and botanically closely allied to the peach and other amygdaleæ. There is not so great a difference, as has been shown by Endlicher and Guibourt, between the properties of colocynth and the more edible fruits of the same order, like melons and pumpkins, only that in the cultivated species the active principle is more diluted by an excess of starch and sugar. Similar is the relation of the sweet-potato and jalap; here the influence of cultivation is clearly demonstrated, and to what extent this influence may alter plants is

well known. It is also the case with the cultivated plum compared with the harsh sloe of our hedges. The carrot and the hemlock are also mentioned among the exceptions; but, in the first place, it must be remembered that both are situated near the boundaries of a very large order, and that they both differ materially in their organic structure. Conium and analogous plants contain a sap which is absent in the non-poisonous Umbelliferæ. J. Chatin asserts that the active substance is not distributed in the fruits of hemlock in the same manner as in the other Umbelliferæ.

If plants are viewed from the standpoint of their chemical composition a deduction of the Linnæan principle is obvious, which, when their therapeutic properties were studied, seemed inexplicable. There are analogies of the characters and compositions which exist between allied families. DeCandolle says in regard to them: "We may even assume that the properties of certain families resembling each other in their organic structure are similar otherwise."

To make this part of the question explicit a truly natural botanic classification would be required, *i. e.*, one that would indicate the origin of the various Species, Genera and Orders, as well as the many ties which connect them, and also the process of development they went through. Such a classification could not be demonstrated by a table, but instead a geographical chart, as it were, would have to be imagined, with the Species, Genera and Families arranged in such a manner that the connecting species are bounded by the neighboring families. In the present condition of science this is impossible; nevertheless, the relation of organization existing between certain families may be taken into consideration. Let us see, in a few examples, whether the active principles attempt to intermingle to the same extent as the physical characters of two allied families do.

We will begin with the important group of *Rutaceæ*. Botanically, this family is placed among the Burseraceæ, Ochnaceæ, Ranunculaceæ and Geraniaceæ. Its relation to the *Burseraceæ* is established by the analogy between Ailanthus and Rhus. As we approach from this point we find that to the resinous constituents of the Burseraceæ an acrid volatile substance is added (Rhus toxicodendron); the bitter principle of the Rutaceæ disappears and is replaced by acrid, volatile principles (Ailanthus glandulosa). Quassia and Picræna, neighbors of *Ochnaceæ*, contain, like these, bitter substances. According to Baillon, the *Ran-*

unculaceæ are connected with Rutaceæ through the genus Crossosoma, which possesses the bitterness of Quassia; lastly, the *Zygophyllaceæ*, with aromatic, astringent leaves, are closely allied to the *Geraniaceæ*.

The *Berberidaceæ*, similarly examined, should be placed between the Menispermaceæ, Papaveraceæ and Ranunculaceæ. The botanic relation between *Menispermaceæ* and Berberidaceæ is very close, and in both the same active principle, berberina, predominates. The tie connecting the Berberidaceæ with the *Papaveraceæ* is, for the former, Podophyllum and Jeffersonia, and for the latter Sanguinaria; these genera nourish, too, on their colored, acrid and emetic sap. The *Ranunculaceæ* are connected with the Berberidaceæ by containing Berberin in common.

The *Cruciferæ*, *Capparidaceæ* and *Resedaceæ*, botanically allied, contain in various quantities the same active substances (acrid sulphuretted oils). The *Polygalaceæ*, *Caryophyllaceæ* and *Violaceæ* are related by their characters as well as by the saponin and analogous substances (polygallic acid, violin).

We may mention yet that the *Lequimosæ* and *Rosaceæ* are rich in gum and tannin; the *Juglandaceæ*, *Balsaminaceæ* and *Myricaceæ*, in aromatic oleo-resins; the *Myristicaceæ*, *Monimiaceæ* and *Lauraceæ*, all rich in aromatic oils.

Sometimes the botanical similarity is not prominent enough to support that of the chemical constitution. For instance, the *Ranunculaceæ* and *Alismaceæ* contain an acrid, volatile body, which is dissipated by drying, but whose chemical nature is scarcely known. Though both families are placed far apart in our systems, they show certain analogies which have been recognized by Andanson and A. L. Jussieu already. Baillon says in reference to this, "Certain Alismaceæ are only to be distinguished from certain water ranunculi by the number of cotyledons contained in their embryo."

Finally, there exists, according to Claus, a similarity in the structure and composition between the lower plants and the inferior animals. Cellulose is found in the cloak of the lower molluscs (Ascidia); Chlorophyll in several animals (Stentor, Hydra, Bonellia). Cholesterin and other characteristic constituents of the nerve-substance have been found in the organs of Leguminosæ. This at first glance appears strange, but it must not be forgotten that the respective organs perform a function similar to the animal organs.

These few examples, which could readily be multiplied, seem to confirm satisfactorily the natural law, the examination of which has been attempted in the foregoing. In every instance where the facts are established, and where the organic structure is known, invisible gradations become evident by which nature succeeds in the gradual differentiation of living beings, and which make our classifications appear incomplete.

Conclusions.—1. Botanic species and families which are similar in their characters are also similar in the nature and properties of their constituents.

2. The species which form the connecting link between similar groups contain constituents belonging to the allied families.

3. The botanic and natural classification of the medicaments of vegetable origin is the only scientific and rational one.

THE SUNDEWS AND THEIR USES.

By Pierre Vigier.

Abstract from a paper published in "Bull. génér. de Thérap," July 15, 1878.

The first author who has written on and figured the round-leaved and intermediate sundew during the sixteenth century is Dodonæus, of Belgium, who considered them too drying, acrid and hot to be of any service in consumption, in which disease the plants were then employed. Tabernæmontanus (1588) states that these sundews have an acrid and burning taste, and are hot and drying in the fourth degree. Heermann (1715) used the sundew in phthisis, and claims that it diminishes asthma, relieves hoarseness and imparts strength. Siegesbeck (1716) found the taste of the leaves to be acid, and of the flowers and fruits to be bitter; that the juice coagulates warm milk, and that the plant produces in sheep which eat it a serious cough. He prescribed the decoction of the fresh herb in catarrhal bronchitis, and employed a tincture with success in influenza (*grippe*) and in epidemic pertussis in 1712. Linnæus stated that the acrid juice of the droseras is useful against warts, and Haller asserted that the sundew produces excoriations of the skin. Hahnemann and other homœopathic practitioners confirmed its efficacy in phthisis and severe coughs. Vicat, in his treatise on the poisonous plants of Switzerland, regards the sundews as corrosive, as ulcerating the skin, and as hurtful for the teeth; notwith-

standing this, they were employed against coughs, asthma and ulceration of the lungs.

The Pharmacopæia of Wirtemberg contained a compound *syrup of sundew* and an *elixir pectorale Wedelii*, having sundew as one of the ingredients.

In the second half of the eighteenth century, the sundew fell into discredit, and in the beginning of the present century it was rarely asked for, and few pharmacists kept a preparation of sundew.

In 1860 Dr. Eugene Curie experimented with the drosera upon animals, and reported his observations to the Paris Academy of Science, September 2, 1861; he had administered the plant in pulmonary consumption in the form of tincture and of alcoholic extract. In 1863, the author obtained from an herbalist, in the Vosges, several hundred kilograms of Drosera rotundifolia, at the rate of 10 francs per kilo, the fresh plant being received twice a week in a state of perfect preservation. It was immediately bruised, mixed with its own weight of alcohol, and after maceration for a month, expressed, and the tincture filtered. This had an alcoholic strength of 56 volumetric per cent., could be indefinitely preserved, was of a dark-brown color and a peculiar odor, and contained all the medicinal principles of the plant. On one occasion an assistant, while expressing the tincture, had kept his hands in it for some time and found the skin as if it had been burned.

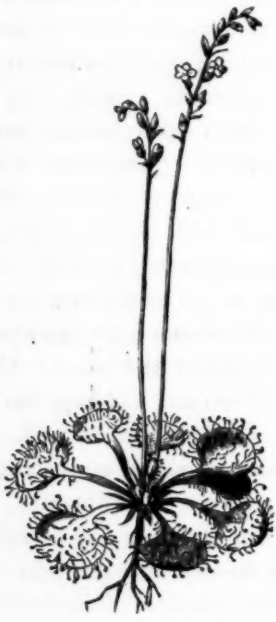
On distilling off the alcohol, an extract of slight consistence, but easy of administration and therapeutically active, was obtained. Pills were made, consisting of 5 grams of this extract, and a sufficient quantity of liquorice root, the mass being divided into 100 pills.

Several years afterwards the author had sundew collected in the forest of Saint Léger and received *Drosera longifolia*, in masses agglutinated by the juice of the glands and mixed with damp earth and mosses. This lot was only used for preparing the extract, which had the same properties as that of the preceding species.

The author has since succeeded in having the sundew collected at 5 francs per kilo, and since it takes 7 kilos of the fresh plant to produce 1 kilo of the dry, it follows that a kilo of the latter costs 35 francs, and could not be furnished in commerce for less than 40 or 50 francs. The author has not yet succeeded in cultivating the two species of drosera.

The dried plant, treated with 60 per cent. alcohol, yields one-fourth

of its weight of extract. 1 kilo of the fresh plant gives, with 1 kilo of strong alcohol, 1,500 grams of tincture, which, therefore, contained in 1,000 the extractive matter of 666 grams of the drosera. 1 kilo of this tincture yields 25 grams of extract; 1 kilo of the fresh plant furnishes 143 grams of dried product, and 100 grams of the latter yields 25 grams of extract, the same as 1 kilo of the tincture. The dried plant, treated with ten times its weight of 60 per cent. alcohol, yields a tincture identical with the above, obtained from the fresh plant.[1]



DORSERA ROTUNDIFOLIA, *Lin.*

DORSERA LONGIFOLIA, *Lin.*

The author reports also on the physiological and therapeutical properties of drosera, mainly from the observations made by Mr. Curie. Although favorable results were observed in phthisis by the persistent use of this remedy, it failed in most cases, and appears to be best adapted in such which present symptoms of bronchitis. The best results were

[1] Tinctures made from fresh plants are called *alcoolatures* in France. According to the French Codex they are prepared from the bruised plants by maceration for ten days with an equal weight of 90 per cent. alcohol.—EDITOR.

obtained with daily doses of 10 to 15 grams of the tincture, but much larger quantities may be administered without inconvenience.

NOTE BY THE EDITOR.—Both species of drosera, which are represented above in their natural size, are indigenous alike to North America and Europe. We append a botanical description which is copied from "Gray's Manual."

DROSERA, *Lin.*, Sundew.—Stamens 5; stiles 3, or sometimes 5, deeply two-parted, so that they are taken for 6 or 10; slender, stigmatose above on the inner face; pod 3- (rarely 5-) valved, the valves bearing the numerous seeds on their middle for the whole length. Low perennials or biennials; the leaves clothed with reddish gland-bearing bristles, in our species all in a tuft at the base; the naked scape bearing the flowers in a one-sided raceme-like inflorescence, which nods at the undeveloped apex, so that the fresh-blown flower (which opens only in sunshine) is always highest. (The glands of the leaves exude drops of a clear glutinous fluid, glittering like dew-drops, whence the name, from *δροσερός*, dewy.)

1. D. ROTUNDIFOLIA, *L.* (Round-leaved Sundew.) Leaves orbicular, abruptly narrowed into the spreading hairy petioles; seeds spindle-shaped, the coat loose and chaff-like; flowers white, the parts sometimes in sixes.—Peatbogs, common, especially northward. July, Aug.

2. D. LONGIFOLIA, *L.*—Leaves spatulate-oblong, tapering into the long, rather erect, naked petioles; seeds oblong, with a rough, close coat; flowers white (D. intermedia, *Hayne*).—Bogs, less common. June—Aug. Plant raised on its prolonged caudex when growing in water.

PLANTS USED by the INDIANS of the UNITED STATES.

BY DR. EDWARD PALMER.[1]

The first paper upon this subject by the writer was published in the Report of the Department of Agriculture for 1870. The present paper will embrace all the additional matter that has since come under his observation.

FRUITS AND NUTS.—*Juniperus pachyphlæa*, Torr., one of the finest ornamental Junipers, its wood being excellent for cabinet work; height about forty feet, and diameter from two to three feet. Abundant in Arizona. Its fruit, a staple article of food among the Indians, is sweet, having but little of the juniper taste. As soon as ripe the Indians commence to eat the nuts raw, and to lay up great quantities for winter use. They are then ground fine and made into bread.

[1] The writer wishes to acknowledge his obligations to Prof. Asa Gray; Mr. Sereno Watson, of Cambridge, Mass.; Dr. C. C. Parry, Davenport, Iowa, and Dr. George Vasey, Department of Agriculture, for kindly determining the species.

J. Californica, a dwarf but showy overgreen. Southern Californian Indians consume immense quantities of the fruit which is sweet and is eaten as soon as ripe. When the fruit is dry it is either ground fine and made into bread, or boiled in water to the consistency of mush. It must be nutritious, as the Indians get fat on it.

J. Californica var. *Utahensis* attains a height of twenty or twenty-five feet in Utah, and a diameter of twelve inches. The Utes eat the fruit raw or made into bread. As in the former species, the taste is quite sweet. These Indians use what they call Noo-ahn-tup, or what appeared to be excrements of insects left in hollows of the junipers, said to be ground and used for mush by the Pah-Ute Indians. The fibrous bark of this tree is made into saddles, breech clouts, skirts and mats to sleep on. The bark is rather brittle and not so good for domestic purposes as that of *Cowania mexicana*.

J. occidentalis.—The berries of this tree are gathered and consumed for food, but have more of a juniper taste than the former species.

Pinus torreyana, a very rare pine, on hills of Solidad, Southern California, only. The nuts are large and wholesome. Only the Indians near by gather them, as they are not in great abundance.

P. monophylla.—The common pine on the border of Lower California. It is a very productive tree. Its seeds, though rich, and good when fresh, are more digestible after being roasted, besides in that condition they will keep fresh a long time. Heat dissipates the oil property of the kernel and renders the hull brittle and easily removed. It is astonishing how many of these nuts an Indian can eat. From morning until night, as long as they last, cracking and eating go on. The Indians get very fat during a good pine nut harvest. They remove the hulls by putting a number of the nuts on a metate, and by rolling a flat pestle backward and forward until the hulls are loosened. The mass is then put into a flat basket tray and the hulls are blown off. The kernels are now ready to be eaten, or ground on the metate to flour, which if made into bread or mush is a palatable and nutritious dish. The interior of the young cone is also eaten.

As soon as the pine cones begin to open the Indians assemble for their great feast and camp among the pine trees during the nut harvest. The fruit upon the ground is gathered up by the children, while the females pluck from the trees the unopened fruit, which they place in a net. Draw-strings are tied around the neck of the net which, when full, is let down by means of a long rope fastened to the centre of the draw-strings. Some one on the ground empties the load, and the net is drawn up to be refilled. Thus for many days this gathering goes on until the supply is exhausted, or they have satisfied their wants. To hasten the opening of the cones, they are thrown on hot ashes for a few minutes The seeds are at once removed and put into an earthen pot over a slow fire. After a few stirrings they are sufficiently parched to render the hull brittle, so as to be easily removed, while the oil in the kernel is set free. By this process the kernel is rendered more digestible and will keep for a long time. If not parched, the seeds would soon become rancid and mouldy.

Algarobia glandulosa or *Prosopis juliflora*, in Texas, Arizona, New Mexico and Sonora, grows from twenty to forty feet high, and eighteen inches in diameter.

Charcoal is manufactured from it, and it is also made into handsome furniture, the grain being very fine. It flourishes where no other fruit tree would grow, and is one of the most useful trees of the deserts. It yields a gum nearly identical with gum arabic for medicinal and technical purposes, especially in the preparation of mucilage, gum drops, jujube paste, etc. In parts of Texas great quantities are gathered for exportation. The Indians have long been acquainted with its valuable properties, for they not only eat it but mix it with mud and cover their heads with it for two or three days. When washed off, the hair of the oldest is not only jet black, but the unwelcome visitors that previously lodged therein are all dead. The leaves of this plant are used by the Indians of Southern California to give the blue color to their freshly tattooed faces, the spines of a species of cactus being used to puncture the skin. The moistened leaves are then rubbed over the markings and the desired color is obtained.

The fruit of this plant is one of the leading articles of diet with the Utah, New Mexico, California and Arizona Indians. It is gathered and housed with great care. Last winter I watched the process of converting the seed-pods of this plant into bread. A female squatted herself on the ground by a wooden mortar, the lower end of which was some distance in the ground. With a long stone pestle she pounded the hard seed-pods into meal. She then took from her head a small conical hat, and sprinkled a little water on the inside, and then a little meal alternately, until the hat or bread-tray was filled. After being patted on the top, it was set on the ground and exposed to the direct rays of the sun for some hours, or until it would turn out a solid cake or bread. So little water had been used to wet the meal that it seemed to me that it would not stick together, but possessing a large percentage of sugar, little water was necessary. This was rather chaffy-looking bread, not unlike that made of corn meal with all the bran in it; nevertheless, it was very sweet. The Indians keep fat as long as this bread lasts.

Quercus Emoryi, a rather common tree in Arizona, but the wood is of no use except for fuel. This tree as well as other varieties in the same region, however, yields abundance of food.

In the Smithsonian collection at the Centennial Exhibition was a sample of sugar from the mountain oak, at McCloud river, sent by L. Stone. The sugar or manna-like substance was in small irregular lumps of a dull color, and very brittle.

Q. undulata var. *pungens*.—This is a dwarf, compact bush, and very prolific. Its fruit is as sweet and as pleasant as fresh chestnuts, and is considered a great delicacy by the Lower California Indians. So ripe are the nuts before they fall, that nearly every one germinates while still in the cup

Q. chrysolepis, the finest of Southern California evergreen oaks, produces the largest acorn and cup, but, though much used as food, the nuts are not considered as good as some others.

Q. sonomensis; a common deciduous oak of the hills about Julian, Southern California, very productive, affording much choice Indian food.

Q. agrifolia; this beautiful evergreen oak is very abundant in Southern California. When deprived of its branches, it will sprout again as freely as a willow. Its fruit is considered by Indians superior to all other acorns. The failure of the acorn crop is a serious loss, and drives the Indians of Southern California to hunt up every

kind of substitute for them. In preparing a food from acorns, the first thing is to take off the hulls. This is done in a mortar by a few slight strokes. The hulls are then removed, and the kernels reduced to a very fine meal. As all acorns, with few exceptions, possess a bitter, astringent property, which renders them unfit for food until it is removed, the Indians accomplish this by laying a coarse flat basket or strainer on a pile of gravel with a drain underneath. Rather fine gravel is now scattered thickly over the bottom, and up the sides of the strainer, and the meal laid thickly over this gravel. Water is added, little by little, to set free the injurious matter. When the water ceases to have a yellowish tinge, the deleterious property has been separated. The meal is removed by the hand as much as possible, after which water is poured over the remainder, so as to get the meal together. It is then scooped up by the fingers, very little being wasted in the operation. The meal is cooked in two ways: First, by boiling it in water, as we do cornmeal mush. When cooked by this process, it is not unlike yellow cornmeal mush in appearance and taste. The second mode is to take the meal, as soon as it is washed, and make it into small balls which are wrapped in green corn leaves. These balls are then placed in hot ashes, some green leaves of corn are laid over them, and hot ashes placed on the top of sufficient thickness to bake the cakes. These are considered extra nice by Indians. Females not only gather and store the acorns, but perform all the work necessary to convert them into food.

Rhus aromatica var *triloba* (Squaw berry), so named because the Indian women gather large quantities of the berries which are used as food. They are of a red color, and excessively sour, but very much used while fresh, during the summer months. The berries when macerated make a very pleasant drink, and they are also dried for food. The young twigs of this plant are used in the manufacture of baskets. The wood exhales a peculiar odor, which is always recognizable about Indian camps, and never leaves articles made from it. It grows loosely in mountain ravines, and attains a height of five to eight feet.

In Utah, Arizona, Southern California and New Mexico the Indians depend solely upon this plant for material out of which to make their baskets. It is far more durable and tougher than the willow, which is not used by these Indians. The mode of preparation is as follows: The twigs are soaked in water to soften them, and to loosen the bark, which is scraped off by the females. The twigs are then split, by the use of the mouth and both hands. Their baskets are built up by a succession of small rolls of grass stems over which these twigs are firmly and closely bound. A bone awl is used to make the holes under the rims of grass for the split twigs Baskets thus made are very durable, will hold water, and are often used to cook in, hot stones being dropped in from time to time until the food is done.

Cerasus ilicifolia.—Indians eat this fruit and save the seeds which they consume raw, or ground and cooked into mush. They are dried whole or split. This is a very common plant in California, and is very productive. Its fruit is of a yellow color, with a pink tinge, and has the shape of gage plums, but possesses little pulp. The seeds are large, affording much food.

C. demissa.—The wild cherry of Southern California, a dwarf bush, but very

productive. Its fruit is palatable, either fresh or dry, and in both conditions it is largely consumed by the Indians.

Sambucus glauca (White elderberry); *S. racemosa* (Red elderberry).—The fruit of both these species is eaten by Indians. In Southern California the red species is preferred, being more fleshy and juicy than the white.

Mesembryanthemum acinaciforme (called strawberry). Its fruit resembles the strawberry in taste. This is one of the common plants along the sea-cost of Southern California, growing on sand beaches. It is very productive, and is eaten not only by Indians, but by Mexicans and other Whites.

Lycium pallidum, with scarlet fruit; *L. Berlandieri*, Arizona, with fruit of a red color.

L. Andersoni.—Fruit bright red, or amber color; Central Arizona and South-eastern California. The berries of these *Lyciums* are eaten by Indians of Arizona and California; in fact, Whites relish them also. They are quite agreeable to the palate, being of a sweet, mucilaginous substance, and adapted to warm climates The clear bright-colored berry has a very tempting look, and when dried, resembles in taste dried currants.

Brahea armata.—This fine palm, found at the bottom of the Big cañon of the Tantillas, Lower California, grows from fifty to sixty feet high, its long, graceful, pendant branches of fruit making it a beautiful object. The Cocopah Indians consume large quantities of this fruit while fresh, and dry it for winter use; they also eat the base of the young leaves.

Pritchardia filamentosa.—This tree, from forty to fifty feet in height, is not so beautiful as *Brahea armata*, but its fruit is better food, containing more pulp, being much larger and of a more agreeable taste. Cocopah Indians consume the fruit fresh and dry in great quantities; the leaves could be applied to many useful purposes. In the spring the base of the young leaves is eaten raw by the Indians. The seeds of both these species of plants are ground fine and eaten, and are not inferior to cocoa-nut.

Shepherdia argentea (Buffalo berry), grows by water courses in mountainous districts of Central Utah. The habits of the tree are similar to those of the elderberry. It grows from ten to fifteen feet high, bears abundantly, fruit red, small, roundish, sour, but has a pleasant taste.

Amelanchier alnifolia (Service berry).—The fruit of this bush is much esteemed by both Indians and whites.

Rhus integrifolia, produces abundance of red berries that are very acid. Indians of Southern California place them in water to form a cool acid drink.

Ribes Menziesii.—Fruit very thorny, but Indians scald them to make them eatable.

Simmondsia californica.—The nuts of this plant yield a very fine oil. Indians of Southern California use them as an article of food.

Arctostaphylos tomentosa, *Manzanita* of the Spanish.—The fruit is produced in clusters, and resembles a small apple. It is of an agreeable acid sweet, and is consumed largely by Indians and Mexicans, both in the ripe and dry state. Indians dry the berries in great quantities, and prepare a favorite drink from them. A quantity of the dried fruit is slightly pounded until the pulp is separated from the seeds and outer rinds, the flour or finely-pounded pulp is separated and mixed with water,

which is allowed to stand until fermentation takes place, when it becomes intoxicating. This fruit, flour or dust is also eaten dry. The seeds after being deprived of their covering are ground fine and made into mush. A favorite mode of using the dried fruit is to grind it up fine, and after mixing the flour with water, to form the mass into thin flat cakes, which are baked in hot ashes. This bread is sweet and not disagreeable to the taste, though it has a repulsive, clay-like appearance of a reddish-brown color. All the western Indians relish this fruit in whatever way it is prepared. The Pah-Ute Indians use the leaves as tobacco and for medicine.

Photinia arbutifolia.—A beautiful tree whose berries are eaten by Indians of California, being first parched and ground and then made into mush.

Vitis arizonica, V. californica.—Indians of California, Arizona and Southern Utah consume large quantities of both species of grapes in the ripe state. They dry them also for winter use. The seeds of the ripe fruit are saved and ground fine, and eaten in that condition; they sometimes also grind up the dried grapes and cook them. The Pah-Utes at St. Thomas, Nevada, had several sacks of dried grapes for sale last spring.

Comandra pallida.—This plant yields a small nut, which is eaten raw by the Pah-Utes and the white children of Utah. If eaten too freely it produces nausea.

ROOTS AND TUBERS.—*Apios tuberosa*, common throughout the Northern and Southern States. It is known under the name of *Saa-ga-ban* by the Micmacs, by whom the pear-shaped roots are used as an article of food. The tubers are about the size of cherries, resembling common potatoes in taste, shape and odor. The skin is of a rusty or blackish-brown color. They contain a large per cent. of starch, which resembles that of wheat, and are very wholesome.

Zamia integrifolia (coontie root).—From the tubers of this plant the Florida arrow-root is made. It is abundant in the Southern part of the State. The tubers are large, frequently a foot long and three inches in diameter, rough and dark on the outside, but white inside and yield a large percentage of starch. It possesses an acid, poisonous ingredient, which has to be washed out in the process of converting the root into starch. The Indians of the Everglades consume a great deal of starch as food, prepared by their rude processes, and also sell some, but it is inferior to that prepared by Americans with improved machinery.

Hesperocallis undulata (White lily).—The bulbs of this beautiful plant are used as food by the Indians of Arizona.

Sagittaria simplex.—The Mojave Indians of the Colorado river, Arizona, as soon as the water subsides in the spring, dig the bulbs of this plant, which resembles the crocus root. It is exceedingly farinaceous and palatable, whether raw or cooked with other substances.

Cnicus occidentalis?—The roots, which are about the size of carrots, are sweet and well flavored, but require a long preparation to fit them for use. A favorite food of the Pacific coast Indians.

Carum gairdneri.—The tuberous roots of this plant are much eaten by the Indians of the Pacific coast, either raw or boiled with other substances. When raw it has a nutty taste, but when cooked assumes a carroty flavor. Its outer surface is grayish, but its interior is white and farinaceous.

Milla capitata var. *pauciflora*, commonly called by the Mexicans of Sonora and

Arizona, Corvena. It is rather a small bulb, resembling the crocus both externally and internally. Its taste is agreeable, sweet and mucilaginous, and it is considered very nutritious, even by Americans.

Amoreuxia schiedeana; *Himajins* of the Papajos; *Saya* of the Pimos. It furnishes to the Indians of Arizona just named an edible root. They eat it roasted or baked in hot ashes. It is quite palatable, with a slightly bitter tang.

Camassia esculenta.—Wild hyacinth, a very common plant in the upper Mississippi valley. Indians and whites eat this root and find it very nutritious, with an agreeable, mucilaginous taste.

Valeriana edulis.—The root of this plant is eaten raw or dried; it is also ground into flour and made into bread or mush by the Pah-Ute Indians.

Claytonia lanceolata.—The roots of this plant, though small, are prized by the Pah-Utes as food, having a pleasant, crisp and nutty taste.

Psoralea castorea, Watson, new species. This plant grows in exposed sandy localities between Beaver Dams, Arizona and St. Thomas, Nevada. The tuberous roots are large, very white and farinaceous. The Pah-Utes eat them raw or cooked in hot ashes, or ground up and made into bread or mush.

Psoralea mephitica, Watson, new species. The leaves of this plant yield a very disagreeable smell, but the tuberous roots, though small, are farinaceous and are consumed as food after being prepared as mentioned for *Psoralea castorea*. It is abundant on the low places between the hills south-east from St. George, Southern Utah, and the Pah-Utes resort there to collect its roots.

Roots of carrots, potatoes, beets, turnips and parsnips are eaten by Pah-Utes. These Indians have acquired the taste for the tubers of all these plants, and they consume them in great numbers, either raw or cooked, without being cleaned. They place them in the hot ashes and devour them when cooked, skins, dirt and all. When boiled, not only are the tubers eaten but the water in which they were boiled is drank.

SEEDS.—Corn, Native Indian; *Ah-weaph* of the Pah-Utes. This variety has been grown by the Indians since the recollection of the oldest person among them. Well preserved kernels and cobs are found in the mounds of Utah. This species of corn grows from two and a-half to three feet high, and is cultivated by the Indians on the river bottoms, maturing in sixty or seventy days. The ears come out of the stalk five or six inches from the ground. Corn is a staple article of food with these Indians. In 1873 a Pah-Ute Chief, Tutzegavet, brought some very fine corn of his own raising to the agricultural fair, held at St. George, Southern Utah, and the first premium for that product was awarded to him.

Helianthus petiolaris, *H. lenticularis*, native sunflowers, *Awk* of the Pah-Utes. The seeds of these plants form one of the staple articles of food for many Indians, aud they gather them in great quantities. The agreeable oily nature of the seeds render them very palatable. When parched and ground they are highly prized and are eaten on hunting excursions. The meal or flour is also made into thin cakes and baked in hot ashes. These cakes are of a gray color, rather coarse looking, but palatable and very nutritious. Having eaten of the bread made from sunflowers I must say that it is as good as much of the corn bread eaten by whites.

Mokeack Sunflower.—A Pah-Ute chief obtained some seed of the large, cultivated

sunflower and planted them, raising a large crop. Now many of the Indians plant this sunflower, and it goes under the name of the Chief Mokeack.

The native sunflower of Utah yields an exudation from the stems of creamy white color, nearly tasteless, but of a gummy nature. It is eaten by the Indians and white children of Utah, or rather chewed in place of pine gum.

Portulaca oleracea.—The seeds of this plant after being reduced to flour are eaten in the form of mush. The plant when tender is cooked as greens by the Pah-Ute Indians.

Sporobolus cryptandrus, or Quaque of the Pah-Utes, a species of grass, the seeds of which are much used by the Indians as an article of food. After being parched they are ground and mixed with water or milk and made into mush or biscuit. The flavor is good, and food thus prepared is very nutritious. The leaves yield a short, fine fibre, adapted to the manufacture of paper. It is abundant about St. George, Southern Utah.

Sporobolus airoides, *Eragrostis Purshii*, *Panicum crusgalli*, and *Vilfa asperifolia* are very abundant grasses in Southern Utah, and their seeds are gathered in great quantities for food by the Indians, who first parch and then grind them to flour, which is eaten either dry or in the form of bread or mush. It is healthful, nutritious and more agreeable in flavor than buckwheat.

Atriplex californica.—This plant grows in ravines and has large, long roots, which are much used by Indians and Mexicans of California as a substitute for soap. After being pounded and mixed with water it is said to be especially good in cleaning woolen fabrics. The seeds of this plant are also gathered, parched, reduced to flour and made into mush or bread. At other times the seeds are ground without parching and used as if parched.

A. Powellii, *A. lentiformis*, *A. expansa*, *A. confertifolia*, *A. Nuttallii*, *A. canescens.*—All these yield abundance of seeds, which are gathered by the Indians of Utah, Arizona and California. The seeds are ground into flour and made into bread or mush.

Sarcobatus vermiculatus, "Grease wood" of the plains.—It produces abundance of seeds, which are prepared for food in the same manner as those of *Atriplex*, and eaten by the Western Indians.

Audibertia polystachya, white sage of California, is a very common plant in many parts of the State. From its flowers the bees make the celebrated honey for which San Diego is famous. Indians gather the seeds and use them cooked with other substances to impart flavor, as we do parsley.

Halostachys occidentalis, called *Tub-bo-welts* by the Pah-Utes.—The seeds are ground fine and made into bread or mush. It is one of the regular articles of diet.

Amarantus leucocarpus, *A. Powellii*, *Camoot* of the Pah-Utes.—The seeds of both these species are highly prized as food products. They are regularly cultivated by the Pah-Utes, and are also found abundant in the wild state on river bottoms. The plants are very prolific in seeds, which are very nutritious and of an agreeable taste. Bread or mush made of the meal is very good and not to be despised.

Lepidium Fremontii, *L. intermedium*, *Sisymbrium sophia*, *S. canescens.*—The seeds of all these plants are ground up with other seeds to impart flavor, and cooked

into bread or gruel. Sometimes they are eaten separately or even in soups. Many of the Western Indians use these seed unmixed as food.

Salvia columbariæ; *Chia* of the Mexicans and Indians of Arizona and New Mexico.—The seeds are used by them as food and medicine. Steeped in water they form a very nutritive drink for the sick. In the form of mush they resemble flax in properties and taste. In Mazatlan, Mexico, a drink prepared from the seed is sold in the streets. The meal forms a fine poultice for wounds, etc.

Medicago sativa, the introduced plant, alfalfa. The Pah-Utes use the seeds ground up and cooked into mush or gruel. The Indians and white settlers gather the tender branches and cook them as greens.

MISCELLANEOUS.—*Scirpus validus* (Tule plant). The Indians of California make bread out of the pollen of this plant, and the root is eaten by many tribes either raw or made into bread. The leaves are woven into mats and are used to cover their huts.

Typha latifola (cat-tail rush.) The Pah-Utes eat the flowering ends, in the spring, raw or cooked. When boiled in water they are very tender, making good soup, which is considered a great delicacy.

Eriogonum inflatum.—The tender stems of this plant are rather acid. They are eaten raw by the Indians of Southern Utah.

Porphyra vulgaris, a sea weed commonly called Laver on our Eastern coast. It is found in nearly all parts of the world at low tide. Many of the Indians along the Pacific coast eat this plant cooked as greens or with meat. It is much relished by Chinamen, and is quite an article of commerce. The Chinamen residing along the coast, at low tides, gather this plant, which is easily taken from the rocks. It is then placed in round masses to dry, after which they are baled and sent to China. It sells from five to eight cents per pound in San Francisco at wholesale, to be shipped to China.

Caulanthus crassicaulis and *Stanleya pinnatifida* are eaten raw in the spring by the Pah-Ute Indians, the young plants being tender, and when cooked taste like cabbage. For this reason these plants are called cabbage by the settlers of Utah. The Indians gather the seeds, and after reducing them to flour make them into mush.

Cotyledon lanceolata, *C. pulverulenta*, *cet.*—The tender leaves of these plants in spring are eaten raw by the Indians of Southern California; their soft, succulent nature causes them to be prized by some white people. As they grow in places not contiguous to water, the moist leaves are used to quench thirst.

Aphyllon californicum and *A. ludovicianum*, are parasitic plants that grow upon the roots of many species. All the plant except the bloom grows under ground, and consequently is nearly all very white and succulent. The Pah Utes consume great numbers of them in summer while on their hunting excursions after rabbits. Being succulent they answer for food and drink on these sandy plains, and, indeed, are often called "sand-food."

Hemizonia fasciculata, *Tar-weed*.—This plant in case of hunger is eaten by the Indians of Southern California after being cooked in the following manner: A quantity of the plants are boiled down until the liquid is of a thick tarry consistency, when it is ready for the stomach of the Indian. Its tar-like taste is objected to by

some. A youthful brave was very careful to inform me that young Indians never eat that stuff. If the procuring and cooking of the same depended upon the young Indians (males), they would go hungry a long time, for their laziness scarcely stimulates them to collect food; even if hungry they expect everything to be done by the older females.

Madaria elegans.—The seeds of this species of tar-weed are ground into flour, made into thin cakes, and baked in hot ashes by the California Indians. When cooked the bread has a gray but not very inviting look, yet the Indian eats it without complaint, though he prefers corn bread.

Arundo phragmitis, a species of cane growing along water courses and about springs in Southern Utah. Numerous small insects puncture the leaves of this plant and a liquid exudes. While in a soft state it is scraped off by the Indians with their long finger nails and eaten. At first it has a paste-like softness, but hardens like gum arabic, with a sugar candy density and color, having a rather sweet, gummy, liquorice taste. When the exudations are sufficiently hardened the cane is cut and laid in bundles on blankets, the manna-like food is then easily shaken off. This substance if mixed with water forms a pleasant, nutritious drink, highly prized by the Indians who call it Pah-gump-pea-abbah.

Honey.—Since the introduction of bees to the Pacific coast the Indians have acquired a taste for honey. The climate being mild the bees increase rapidly, and many swarms yearly escape to trees and rocks, thus giving the Indian a chance to obtain the honey. Some California Indians have domesticated the wild bees. In Southern California the Indians cut down the trees containing bees, put them in a sack, carry away the honey to eat, and sell the bees for one dollar a swarm, the purchaser taking all risks of getting a queen. Bees in a sack, for sale by an Indian, are surely a novel article of trade.—*The American Naturalist*, September.

(To be concluded.)

VARIETIES.

The Use of Thymol.—Thymic acid and thymol can now be had of our leading druggists. It is recommended for use with "Lister's Antiseptic Dressing," in proportion of 1 part to 20 of glycerin aud 100 of water. This solution does not affect the instruments nor benumb the hands of the operator. As a local application it is especially useful, proving not offensive by its odor, like carbolic acid, while at the same time it is more effective, and can be used in smaller quantities. The following formulæ have been suggested:

Glycerole of Thymol.—Thymol, 1 part; glycerole of starch, 100 parts.

Thymol Lotion.—Thymol, 1 part; alcohol, 4 parts.

Ointment of Thymol.—Thymol, 1–4 parts; lard, 100 parts.—*Med. and Surg. Rep.*, August 17.

Large Consumption of Opium.—In the Maryland "Medical Journal," June, 1878, Dr. Chisholm related a case of a man who had taken ʒii of morphia at once, without any bad effect. A child of eight months regularly took fʒii of Magendie's solution in the twenty-four hours. These facts illustrate the remarkable tolerance produced by habit.—*Ibid.*

Quinoidin as a Febrifuge.—The "Lancet" says: At a late meeting of the Académie de Médecine de Paris, M. Burdel, of Vierzon, read a paper on the Febrifuge Action of Quinoidin in the Treatment of Telluric Fevers. M. Burdel remarked that this resin-alkaloid possesses distinct febrifugal properties, and that it is closely analogous in its action to quinia. He finds that, like quinia, it may be freely administered, and with good results, in telluric and benignant intermittent fevers. But it is in quartan fevers and in telluric cachexia that it exerts a specially well-marked action; in these it is even superior to quinia. Like all analogous febrifuge remedies, quinoidin should be given for four or five weeks consecutively, in successive but properly timed doses. Its relatively low price is a great point in its favor. It cannot, M. Burdel thinks, supplant quinia in the treatment of intermittent fevers of an acute type, but it may even in these be a useful auxiliary; while in chronic cases he believes that it is actually superior to quinia.—*Med. and Surg. Rep.*, October 12.

Collection of Caoutchouc on the Banks of the Amazon.—Robert Cross, who went to Para for the purpose of studying the manner of collection and treatment of the milk juice of Hevea elastica, the tree which yields the Para caoutchouc, states that this tree grows in low moist regions; hundreds of caoutchouc-collectors were seen by him on the shores of the Rio Guama, who gather it in the following manner: Starting at daybreak, the native makes a deep longitudinal incision with his ax into the bark of a tree at a height of 2 meters and fastens a clay cup to the bark with a little clay directly under it; 10—12 cm. from this incision, at the same height from the ground, he makes another, and so on until the tree is encircled by incisions; he then proceeds to the next tree. The next morning he makes another circle of incisions into the first tree about 15—20 cm. lower than the first, and continues to do so, until he reaches the ground, when he again commences to cut circles between each two previous ones, commencing at the top. After all trees have been thus treated the collector empties all the cups into a large vessel and carries this to a shed near the river, where the juice is prepared for market, by pouring 2 or 3 cupfuls at a time on an oar-shaped mould, suspended from the ceiling over a constant heat of about 42°C., produced by conducting the heat from a wood fire with atmospheric air through a bottomless earthenware jar, filled with wood and palm-nuts. The mould has a thin clay coating to prevent the juice from adhering, and is kept in constant motion. The milky juice soon turns yellow; when sufficiently dry a new lot is poured on it, and so on until the mass is about 10 to 12 cm. thick, when the mould is withdrawn, the caoutchouc dried in the open air for several days, and is then ready for the market.

On the upper Amazon and in the province Ceara the manner of collection differs slightly; there the native cleans the outer bark carefully, and having surrounded the tree with a clay spout makes a large number of incisions above this, allowing the juice to run down over the bark into the spout, which accounts for the impurities always found in that caoutchouc, known as Saramby.

Cross thinks that a by far preferable method of preparing the juice would be to expel the water by heating the juice in shallow dishes over a water-bath, and also that many regions of the Malayan Peninsula, of British Birma, Ceylon and Coromandel would be suitable for cultivating Hevea elastica.—L. V. C.—*Pharm. Zeitschr. f. Russl.*, July 1, 1878, p. 407, from *Oest. Handelsjourn.*

Guaiacum as a Test for Copper. By E. Purgotti.—Schönbein had noticed that copper salts in presence of cyanides gave a blue color with guaiacum, and the author has since found that ferrocyanides, nitroprussides, sulphocyanates and cyanates, and also alkaline chlorides and chlorides of the alkaline earths produce the same effect as cyanides. On this reaction he has found a test for copper. The solution which must be free from all substances, such as ferric salts, etc., which color guaiacum blue, is mixed with a solution of an alkaline chloride and poured gently down the side of a test-tube containing an alcoholic solution of guaiacum; if the most minute trace of copper is present a blue color is produced at the junction of the two liquids, and if the quantity of copper be larger the whole of the liquid becomes blue on agitation; in this way ·001 milligram of $CuSO_4.5H_2O$ in a decigram of water gives a distinct coloration. The action appears to be due to oxidation by the cupric chloride $2CuCl_2+H_2O = Cu_2Cl_2+2HCl+O$.—*Jour. Chem. Soc.* [Lon.], September, 1878, from *Gazetta chimica italiana*, viii, 104—107.

Estimation of Calcium Tartrate in Crude Tartars. By A. Scheurer-Kestner.—The ordinary method of estimating calcium tartrate, by precipitating a solution of the crude tartar in hydrochloric acid with caustic soda, does not give correct results in presence of calcium sulphate, as the calcium sulphate and sodium tartrate undergo double decomposition, forming calcium tartrate and sodium sulphate.

To avoid this source of error, it is proposed to dissolve the tartar in hydrochloric acid, and to precipitate the whole of the tartaric acid, as calcium tartrate, by the addition of calcium chloride and caustic soda. The precipitate is washed, dried and calcined, and the resulting calcium carbonate estimated by titration in the usual way.

Another portion of the tartar is treated with hot water, and the solution is titrated with standard soda. From these data the amount of calcium tartrate and of potassium bitartrate in the crude material can be calculated.—*Ibid.*, August, 1878, from *Compt. rend.*, lxxxvi, 1024—1025.

Some Reactions with Lindo's Test for some of the Bases in Opium. By How.—The following reactions are obtained by Lindo's reaction with sulphuric acid and ferric chloride ("Chem. News," xxxvii, 158, and this vol., p. 678):

Papaverina dissolves in sulphuric acid to a pale purple fluid, which becomes very pale and then brownish on standing about an hour. The addition of ferric chloride and warming cause the purple color to change quickly to yellow, while the liquid becomes turbid; the addition of water gives a colorless liquid, becoming pale yellow next day.

Narcotina dissolves to a bright yellow liquid, becoming orange on standing about an hour; then treated as above, a blood-red is produced, soon assuming a purplish tinge, then a bright red, resembling ferric thiocyanate, and remaining permanent at least for a fortnight.

Cotarnina gives first a clear, dark brownish-yellow solution; then, with ferric chloride, a whitish precipitate, dissolving to a dark red liquid, which with water assumes much of the color obtained with narcotina, but perhaps paler. It is equally permanent.

Narceina dissolves to an orange liquid, which becomes turbid and purplish, and finally of a pale red color.

Strychnia dissolves to a colorless liquid, and affords successively a clear yellow and a colorless liquid.

Brucia gives first a pale amethystine solution, then orange-yellow or red-yellow looking across the tube, and red on looking down it; on further solution an amethystine red, becoming pale, but still distinct, at the end of a fortnight.

Caffeina gives successively a colorless, a bright yellow, and a colorless fluid.

Piperina dissolves to a deep red, nearly black liquid, with a flocculent deposit on heating with ferric chloride; the addition of water gives a yellow liquid, the deposit appearing dark brown; the liquid was nearly colorless the next morning.

Betulin gives a dirty green-brown liquid, becoming clear and colorless with water.

Coumarin gives an orange-yellow clear liquid, which water renders very pale yellow.

Phloridzin (from bark of stem and roots of the apple tree) dissolves to a blood-red liquid, which is orange-colored at first, if very little of the substances is used: water gives a small flocculent precipitate, and leaves the solution of an orange color.

Quinia sulphate of commerce dissolves to a pale yellow liquid, which turns deeper yellow when warmed with ferric chloride, and colorless with water.

Cinchonia, impure, gives clear yellow, turbid yellow, and yellowish liquids.

Bebeerina sulphate, in brown scales, dissolves to a very dark liquid, becoming red with more sulphuric acid; with ferric chloride and warming, a dark green liquid—as seen over white paper—is produced, which gives with water a dirty yellow liquid —*Ibid.*, October, 1878, from *Chem. News*, xxxvii, 244.

Euphorbone. By O. Hesse.—Euphorbone was obtained from euphorbium by extracting with petroleum ether, and allowing the solution to evaporate spon-

taneously. On treating the semi-crystalline residue with hot alcohol, and, after the solution had cooled somewhat, pouring off from resin which was deposited, crystals separated which were purified by crystallization from acetone.

From his own analyses and those of Rose, Dragendorff, etc., the author deduces the formula, $C_{15}H_{24}O$, for euphorbone. This substance is isomeric with lactucone; or perhaps it may possess the double formula, $C_{30}H_{48}O_2$, and so be an isomeride of echicerin. Euphorbone melts at 113—114°C. For a chloroform solution the rotatory power of euphorbone is $(\alpha)d=+18{\cdot}8$ at 15°; and for an ethereal solution $(\alpha)d=+11{\cdot}7°$.—*Ibid.*, October, 1878, from *Liebig's Annalen*, cxcii, 193—195.

Tannin and Bitter Principle of Hops. By C. Etti.—The substance named "lupulo tannic acid" by the author does *not* precipitate gelatin; if, however, it is dried at 120—130°, it changes from yellowish-white to red, loses water, and when dissolved in very dilute alcohol, *precipitates gelatin completely* just like ordinary tannin.

On heating the yellowish alcoholic solution of the original tannin on the water-bath, it becomes red, and on evaporation a dark red residue remains, which also precipitates gelatin when again dissolved in dilute alcohol. The author calls this "phlobaphen."

Analysis gives the same composition for this as for the red compound obtained by heating the lupulo-tannic acid at 120—130°, each having the formula $C_{50}H_{46}O_{25}$; and they may be supposed to result from the expulsion of a molecule of water from two molecules of tannic acid of the formula $C_{25}H_{24}O_{16}$.

The coarsely powdered hop flowers are placed in an extraction apparatus, and after being freed from resin and bitter principle as much as possible, the mass is extracted with 20 per cent alcohol. On evaporating to a small bulk and cooling, a red precipitate of phlobaphen is formed; this is dissolved in 90 per cent. alcohol, evaporated to dryness and heated to 120—130°. If it tastes bitter, the bitter principle may be removed by ether. Phlobaphen is easily soluble in alkalis, and is precipitated unchanged by dilute mineral acids On boiling the freshly precipitated and not previously heated phlobaphen with dilute mineral acids it is decomposed, glucose and one molecule of water being split off.

As the phlobaphen is easily prepared, is constant in composition, and precipitates gelatin solution completely, it may be estimated quantitatively like tannin, and may be used in standardizing the solution employed.

An etherial extract of hop flowers contains, besides an essential oil, chlorophyll, a crystallized white and an amorphous brown resin, to which the bitter principle adheres. After driving off the ether, 90 per cent. alcohol dissolves brown resin and the bitter principle, which may be separated from each other by adding water as long as the resin continues to be precipitated. Repeated solution in alcohol and dilution with water frees the resin from the bitter principle. The aqueous solution is evaporated in a vacuum over sulphuric acid, the amorphous residue dissolved in 90 per cent. alcohol, again evaporated, and so on repeatedly, until well-formed extremely bitter, colorless crystals are obtained. The crystals are completely soluble in water. These experiments oppose the idea that the "bitter resin" of hops can be dissolved in water only with the aid of sugar, tannic acid, gum, etherial oil, etc. The brown amorphous resin and the bitter principle of hops are two fundamentally different substances.—*Jour. Chem. Soc.* [Lond.], Oct., 1878, from *Dingl. Polyt. J.*, ccxxviii, 354—357.

MINUTES OF THE COLLEGE.

PHILADELPHIA, September 30th, 1878.

The semi-annual meeting of the Philadelphia College of Pharmacy was held this day at the Hall of the College, No. 145 North Tenth street, Dillwyn Parrish, President, in the chair; twenty-seven members present.

The minutes of the last meeting, in June, were read, and, on motion, approved.

The minutes of the Board of Trustees were also read by Wm. C. Bakes, Secretary of the Board, and, on motion, adopted.

By these minutes we are informed that in June last two gentlemen passed a satisfactory examination before the Professors and Examining Committee, and, having been by them recommended to the Board of Trustees for the degree, they were elected Graduates in Pharmacy. Their names are:

Aug. Dreher. *Thesis*—Examination of a case of arsenical poisoning.

Thos. E. B Kernan. *Thesis*—Solution of oxychloride of iron.

Thomas S. Wiegand, on behalf of the committee appointed in March last, and continued in June, to take such action as might be necessary to effect an amendment to the Constitution of the College relative to the election of Trustees, and other matters, reported that they had effected the changes desired by the College by application to the court, and that the charter as amended will now read as follows:

Section 2. "The said College may establish by-laws and rules for its government and regulation, and for the preservation and application of the funds thereof, not repugnant to the Constitution and laws of the United States or of this Commonwealth; and shall have power to erect an edifice for their accommodation, and to constitute a faculty, or learned body, to consist of such head or heads and such a number of professors in pharmacy, materia medica, chemistry and the collateral sciences, as they may judge necessary and proper; and shall have power to confer degrees in pharmacy upon its graduates, and to do everything needful and necessary to the establishment of said College and Faculty."

Section 3. "The officers of said College shall be a President and two Vice Presidents, a Recording Secretary, a Corresponding Secretary and a Treasurer; and the respective duties of all of said officers shall be assigned by the by-laws. All of said officers shall be elected for the term of one year at the stated meeting of the College held in the month of March, and any vacancy that may occur may be supplied by a special election, to be held at the next stated meeting after the occurrence of said vacancy. There shall also be elected a Board of Trustees, consisting of eighteen members, in the following manner: Nine Trustees shall be elected at the stated meeting in September, 1878, three of them for the term of one year, three of them for the term of two years and three of them for the term of three years. At the stated meeting in March, 1879, nine Trustees shall be elected, in the same classification and for the same terms. At each subsequent stated meeting held in March and September of each year three Trustees shall be elected in the place of those whose terms will then expire, to serve for the term of three years.

"Vacancies in the Board of Trustees may be filled for the unexpired term at any regular election after any such vacancy shall occur. The President, the two Vice-Presidents, the Recording Secretary, the Corresponding Secretary and the Treasurer shall also be members of the Board of Trustees so long as they shall continue in office. Thirteen members of the Board of Trustees shall constitute a quorum. The said Board of Trustees shall have power to conduct the ordinary affairs of the College, and make such by-laws, rules and regulations, and do all such other proper

acts as they may deem necessary for the government and support of the College and of the School of Pharmacy; and also to perform such duties as are or may be from time to time committed to them by the said College. The acts of the Board of Trustees are, however, to be subject to the revision of the College at each stated meeting."

On motion, the amended charter was accepted. The committee were then discharged, with the thanks of the College for the faithful manner in which they had accomplished the work assigned them.

The Treasurer reported the names of three members who are five years in arrears. In accordance with the usual custom their names were, on motion, directed to be stricken from the roll of members.

Professor Maisch called attention to the postponement of the meeting of the American Pharmaceutical Association at Atlanta, Georgia, to Tuesday, the 26th of November, at which time all the members of the Association are requested to attend, as the meeting, it is hoped, will be a large and interesting one.

This being the semi-annual meeting an election for nine members of the Board of Trustees, according to the amended charter, and a committee of three on Deceased Members, was ordered.

The President appointed Messrs. Mattison and Murray tellers, who reported the following gentlemen elected to the respective positions:

BOARD OF TRUSTEES.

For one year—Dr. Wilson H. Pile, William C. Bakes, Edward C. Jones.

For two years—William McIntyre, Alonzo Robbins, E. M. Boring.

For three years—Dr. Adolph W. Miller, Albert P. Brown, Richard V. Mattison.

COMMITTEE ON DECEASED MEMBERS.

Charles Bullock, Joseph P. Remington. Alfred B. Taylor,

Then, on motion, adjourned.

WILLIAM J. JENKS, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, October 15th, 1878.

In the absence of the President, Mr. William B. Webb was called to the chair. The minutes of the last meeting were read and, on motion, approved.

The nomination for a Registrar was necessary, as it was the initial meeting of the series. Mr. Wiegand was nominated and elected.

The Chair requested the members to remind their friends of these meetings, as they would be thus rendered more interesting; and the Registrar requested the members to notify him of all changes of residence of members coming to their knowledge.

Mr. A. P. Brown, President of the Alumni Association, presented to the College library three volumes of "Goldsmith's Animated Nature," on behalf of Mr. Joseph Jacobs, a member of the present class. Accepted with thanks.

Professor Remington called attention to a novelty in compressed pills, which are covered with a layer of sugar. These have been introduced to the trade in a neighboring city under the name of "Vellentimels," and can be easily made by placing a small quantity of granulated sugar in the mould for compressing the pills, then the medicinal ingredients, and finally another portion of sugar, and following it with the piston of the machine, driven by a blow to solidify the mass; when completed the pill will be found sugar-coated. In the same manner powders may be compressed and coated with chocolate or with licorice.

Extract of licorice that had been badly worm-eaten was shown as a curiosity, and such it is, generally; but it is well known that the article known to older pharmacists as "refined licorice" was frequently seen in this condition.

A member present recommended as an excipient for pill masses a mixture of one part of tragacanth, seven parts slippery elm powder, moistened with either honey or syrup. The advantages claimed for pills made with it are solubility and small size (see page 515).

The propriety of making quinia pills with an excipient of sulphuric acid was queried by a member who found that the pills thus made were objected to because they became so hard; another objection has been made that when made up with acid they disagree with the stomach in very many cases.

Pills of chloride of calcium were mentioned as being very troublesome to prepare and very liable to deliquesce in consequence of the extreme solubility of the salt. Even if well made the only remedy, if it must be dispensed in pillular form, is to coat the pill with an ethereal solution of mastic or tolu. The fused chloride should never be used, as in dissolving it, it fixes two molecules of water, and in doing so gives out the latent heat of this water.

This subject gave rise to a discussion about the effects of salts while dissolving, some of which reduce the temperature of the liquid, while others produced an opposite effect.

Mr. Boring called attention to the infusion of colombo, it being a troublesome preparation to make each time it was ordered; he advocated the plan of making it as directed by the U. S. Pharmacopœia, and adding one quarter of a grain of salicylic acid to each fluidounce, to preserve it.

Mr. Webb inquired what was the custom of the trade respecting compound infusion of gentian, whether they generally prepared it when ordered or kept a concentrated preparation and diluted it at the time of dispensing. Mr. Webb stated that he had formerly made it of double the alcoholic strength of the Pharmacopœia, but observation had lately convinced him that a preparation of quadruple strength was preferable.

Professor Remington made an infusion of quadruple strength, and then diluted with a menstruum of 12½ per cent. of alcohol.

There being no further business before the meeting, on motion, adjourned.

THOMAS S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

American Pharmaceutical Association.—The twenty-sixth aunual meeting will be held, as previously announced, in the city of Atlanta, on the twenty-sixth day of November. The reports from the various districts where the yellow fever has been epidemic during the past summer, show that this scourge is rapidly disappearing, and the cooler weather which has recently been prevailing throughout North America deprives a visit to the southern section thereof of all danger as to climatic disease. We repeat the statement made on a previous occasion, that Atlanta offers many inducements for a visit, not the least of which are the mountain scenery and the salubrity of its climate. Members from the Northern and Western States are particularly urged to use their best endeavors for being present on this occasion. The local secretary has informed us that the *traveling arrangements* will remain substantially the same as heretofore announced (see page 403), and that orders for tickets will be required from the permanent secretary. We are also advised that it is contemplated to get up a pleasant excursion to Florida. Further particulars will be given by the permanent secretary in the circular soon to be issued. Quite a number of goods intended for *exhibition* during the week of the meeting have already reached Atlanta, and all who desire to exhibit products of pharmaceutical interest are requested to communicate without further delay with the local secretary.

The chairman of the Committee on the *Centennial Fund* has informed us that contributions have been coming in very slowly, and he requests all members to actively aid in securing this fund for the Association.

The Colleges of Pharmacy.—We are pleased to learn that the Colleges of Pharmacy in the United States, as far as heard from, have opened their annual courses with larger numbers of students than they had heretofore. It speaks well for the young pharmacists that they seek instruction, which in the past generation would be obtained by few only, and that many seek it at the sacrifice of time and money. The benefit derived from these instructions cannot be otherwise but of lasting value to the students, and of increasing that *esprit de corps* which has become more manifest since the foundation of the American Pharmaceutical Association.

Vermont Pharmaceutical Association.—The ninth annual meeting was held at Hubbard's Hall, in Montpelier, October 22d. President Higgins called the meeting to order at 2.30 P.M. Resolutions of condolence were passed in regard to the demise of Luther L. Dutcher, an aged pharmacist of Vermont. At the close of the first session, the president read his annual address, in which he gave a historical sketch of the Association since its organization, and made several practical suggestions tending towards increasing the interest in the Association.

At the second session, held on the following morning, various committees were appointed. The following papers were read: on manufacturing pharmacists and their products, by W. J. Van Patten; on fashion in medicine, by A. O. Gates; and on Vanilla planifolia, by Geo. A. Crossman.

The committee on formulas was instructed to bring the results of their labors officially to the notice of the different medical societies of the State, and urge the recognition of such preparations as the standard for the State.

The following officers were elected for the ensuing year: A. O. Gates, of Morrisville, president; W. J. Van Patten, of Burlington, R. G. Morton, of West Randolph, vice-presidents; C. S. Boynton, of Braneon, secretary; E. C. Lewis, of Rutland, treasurer.

The next meeting will be held at Burlington, at the call of the executive committee.

The Philadelphia College of Pharmacy, we learn from a cable despatch, has been awarded a silver medal at the Paris exposition for the exhibit made of American drugs. The collection will be presented to a pharmaceutical institution in Paris.

The division of the students into two classes was not made any too soon. The number has increased again so that it would be impossible to accommodate them all at the same time in the spacious hall. Six lectures are delivered every week to the junior and the senior class.

Alumni Association, Philadelphia College of Pharmacy.—The First Social Meeting of this season was held in the College building, Thursday, October 3d, 1878, with an attendance of about fifty. In the absence of the president and both vice-presidents, Mr. R. V. Mattison was elected chairman.

The minutes of the last social meeting were read and approved.

Mr. Sayre being called on, spoke of the great importance to the students of the study of Botany and Materia Medica.

Dr. Murray read a lengthy paper on the "Metric System," strongly recommending its study and adoption, and explaining the simplicity and beauty of the system, by means of charts, measures, and on the black-board.

Mr. Mattison stated that it was reported that in France the metric system is little used. Dr. Murray thought it was only in the rural provinces that this was the case. It was mentioned that in New York and Boston the physicians, particularly the younger ones, are in the habit of writing their prescriptions in this system, and that some of the prominent druggists issue charts to the physicians explaining the relation between the metric and the customary weights and measures.

Mr. J. Jacobs presented for the College three volumes of Goldsmith's Animated Nature, printed in 1795.

Mr. Mattison read a paper on "Better Pharmaceutical Education," and one on "A New Excipient for Pills." (See page 515.)

Mr. Butts spoke of having used an excipient made from elm, which answered very well in most cases, but failed with dried sulphate of iron and with acetate of lead.

Mr. Sayre has used for ten years, with almost universal success, a mixture of tragacanth and glycerin, of which he keeps two strengths on hand; one containing 80 grains of tragacanth to glycerin ℥i, and the other double the quantity of tragacanth.

Mr. Mitchell spoke of Scott's codliver oil emulsion being reputed to be made with mucilage of Irish moss, and inquired if any one had any experience in the matter.

Mr. Sayre suggested the subject of pancreatized codliver oil and pancreatic emulsion as a desirable subject for an essay by Mr. Mattison, who declined, having proved to his own satisfaction that pancreatic emulsion is financially and commercially a failure, but therapeutically a grand success.

On motion adjourned.

German Apothecaries' Society.—The seventh annual meeting was held at Coblence, on Wednesday and Thursday, September 10 and 11, Director Wolfrum in the chair. Messrs. Korte, of Essen, and Westphal, of Düsseldorf, were appointed recording secretaries. The Pharmaceutical Society of Great Britain was represented by Mr. Thomas Greenish and Dr. Paul, and the Swiss Apothecaries' Association by M. Perrenoud, of Berne. The German Society has at present 2,779 members, belonging to 92 districts; but it does not yet embrace all the apothecaries of the German Empire.

Among the subjects which claimed the attention of the meeting, we mention the appointment of a permanent Committee on the Pharmacopœia; and the appointment of a committee to inquire into the instruction of pharmacists at the different universities, and into the necessity for having the large number of examination commissions as at present instituted. Various other questions relating to the condition of pharmacy in Germany received due attention.

Professor Fr. Mohr delivered an address on the development of chemistry from pharmacy, dwelling more particularly on the momentous results obtained by Scheele in the pharmaceutical laboratory, and tracing the growth of chemistry to a separate branch of science. The address concluded with a review of the various chemical theories and a consideration of the relations between the pharmacist and the manufacturer of chemical products.

M. Schlickum delivered an address on the instruction of apprentices.

M. Wolfrum intended to resign his official position, but was requested to serve for another year.

The next annual meeting will be held in the city of Hannover.

Swiss Apothecaries' Association.—The thirty-fourth annual meeting was held in Zurich, August 28 and 29; the president, Prof. Schaer, in the chair, Mr. B. Studer, Jr., secretary. The meeting was opened with the annual report of the president, in which the progress of pharmacy and the society affairs during the past year were reviewed.

The transactions of the society were mainly confined to the consideration of affairs relating to the practice of pharmacy in Switzerland. An address on the methods for determining the amount of moisture in air was delivered by Mr. Rosenmund.

The German Apothecaries' Society was represented by Dr. Brunnengräber. The following gentlemen were elected honorary members: Profs. Dragendorff, of Dorpat; Maisch, of Philadelphia, and Reichardt, of Jena.

The next annual meeting will be held at Geneva.

EDITORIAL DEPARTMENT.

The December number of this journal will be issued about a week later than usual, it being considered desirable that the present volume should contain an account of the Twenty-sixth Annul Meeting of the American Pharmaceutical Association, which will convene at Atlanta, Ga, on Tuesday, November 26th.

Official or Officinal.—The editorial remarks on page 449, appended to Dr. Murray's paper on this subject, have called forth the following answer:

The "remarks" not only give room for, but demand an answer. It is given with the desire to bring back to the normal line that which has been refracted, not to appear pugnacious. I hope the affirmative of the original subject has lost no force by its long convalescence. In order to properly connect what follows, it will be necessary to re-read the original article and answer, published in the September number of this journal.

Excusing the general severity of the "remarks," I come at once to an important correction. In the line, "*since* the publication of Dr. Miller's paper," the emphatic "*since*" loses its emphasis when we point to the fact that *official* is exclusively used in Prof. Attfield's "Chemistry," issued in March, 1873; Mr. Squire's "Companion," issued in October, 1874; Dr. John Muter's "Chemistry," issued in March, 1874; and, since Mr. Wills follows Prof. Attfield in his teaching, it is but reasonable to suppose that he had adopted the word not later than 1874, although I have nothing positive on this point earlier than the summer of 1877; while Dr. Miller's article was not published until April, 1875!

To show that words may be long known, yet not generally adopted, I mention that so high an authority as Worcester's "Unabridged Dictionary," 1878, gives *officinal* as relating solely to the shop and not the usual medical definition. The same cannot be said of Webster, but neither notices the term *unofficinal*.

The "correctness" of the word is conceded by no less an American authority than Prof. Henry Hartshorne, who says, in his "Conspectus," page 460, issued May, 1874, "*Official* is the more correct term, though not so commonly employed."

Medicines are "*unofficial*" in the United States when not recognized by the compilers of the U. S. Pharmacopœia; "*unofficial*" in the British Empire when not recognized by the British Pharmacopœia, and so on.

In the second paragraph of "remarks" the citation of unfortunate terms in other connections is not thought particularly relevant. They too, however, may be corrected by confining the terms to their proper application.

Finally, preference should at all times and under all circumstances be given to correctness and definition, not to ambiguity, no matter how aged or how well understood.

NOTE.—This should have appeared last month, but for want of time it was not prepared until the journal was in press. Its position this month is owing to tardiness of the author.

F. MARION MURRAY, M.D.

Tenth month 19th, 1878.

We stand corrected as to the date of the authorities quoted in Dr. Murray's first paper. The additional authority quoted in the above reply sheds no new light on the subject, and it will be observed that Dr. Murray carefully avoids discussing the meaning of *official* as it has been sanctioned by usage, and does not notice the ambiguity of the same word if its application was extended as proposed. The mere citing of authorities is of no avail, and proves nothing except personal preferences. Those who still adhere to the word *officinal*, as it has always been used, we believe

far outnumber those who follow the innovation. That the word *unofficinal* is not noticed in dictionaries, we suppose, is not regarded as a proof that such a word is not in use and has not a certain well-understood meaning.

The few ambiguous terms cited on page 450 were mentioned as examples, to show that ambiguity is much more common than is supposed by some; they were not cited as having any bearing on the question under discussion, as may be seen by anyone who will take the trouble of reading our remarks.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Druggist's General Receipt Book; comprising a copious Veterinary Formulary, numerous Recipes in Patent and Proprietary Medicines, Druggists' Nostrums, etc., Perfumery and Cosmetics, Beverages, Dietetic Articles and Condiments, Trade Chemicals, Scientific Processes, and an Appendix of Useful Tables. By Henry Beasley. Eighth edition. Philadelphia: Lindsay & Blakiston, 1878. 16mo, pp. 510. Price, $2.50.

This book is well known to druggists from its previous editions. The present one is very convenient on account of its smaller size, and will be found to be as useful as its predecessors, containing, as it does, a large number of formulas, covering the ground indicated in the title.

A Guide to the Practical Examination of Urine. For the Use of Physicians and Students. By James Tyson, M.D., Professor of General Pathology and Morbid Anatomy in the University of Pennsylvania, etc. Second edition. Revised and improved. With illustrations. Philadelphia: Lindsay & Blakiston, 1878. 12mo, pp. 172. Price, $1.25.

To prepare a work on urinary analysis which should contain all the essential facts brought forth by analytical chemistry, and at the same time should be small and convenient to consult, is by no means an easy task, which, however, we are glad to say has been accomplished by the author. The familiarity of the author with the subject is evidenced throughout the work in the arrangement of the material, in the selection of the numerous tests for the various pathological products, and in the illustrations. We regard it as admirably adapted for a guide to the student in becoming acquainted with urinary analysis and with the precautions which are to be observed in testing, and for preparing him for the intelligent use of the various larger and more comprehensive works on the same subject, should he desire to extend his researches.

The typographical outfit of the work is likewise commendable.

The Physician's Visiting List for 1879. Twenty-eighth year of its publication. Philadelphia: Lindsay & Blakiston.

This convenient and useful memorandum book for physicians has made its appearance. Its arrangement and size is the same as in former years, and will be found equally useful.